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ABSTRACT

A global survey was conducted to: (1) determine what universities have ocean engineering curricula; (2) obtain information on the nature of these curricula; and (3) determine the similarity of curricula by noting the frequence of occurrence of specific courses or subjects. Results indicate that at least 97 academic institutions in 19 countries have ocean engineering postgraduate curricula. The top four countries having undergraduate and postgraduate curricula include the United States with 25 universities, the United Kingdom with 14, and Japan and China with 11 and 10 respectively. Ocean engineering, as exemplified by the curricula in the institutions surveyed, includes the subfields of harbor and coastal engineering, offshore engineering, marine technology, and the more traditional fields of naval architecture and marine engineering. There exists a definite similarity of subjects or courses included in most ocean engineering curricula. Although a number of institutions have postgraduate degrees in ocean engineering, most degrees are in one of the traditional engineering fields or undesignated by discipline. (The major portion of this document consists of a list of universities, by country, having postgraduate curricula in ocean engineering. Location, courses and degrees offered, degree requirements, and other information are provided for each entry.) (Author/JN)

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Global survey and analysis of post-graduate curricula in ocean engineering

SE044713

Prepared by:
Adrian F. Richards
Efrosine A. Richards

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13	Seminario Latinoamericano sobre Enseñanza de la Oceanografía Informe final del Seminario organizado por la Unesco en São Paulo, Brasil, 17-20 de noviembre de 1978 Spanish only	1981
14	Marine science and technology in Africa: present state and future development Synthesis of Unesco/ECA survey missions to African coastal states, 1980 Available in English and French	1981
15	Fishery science teaching at the university level Report of a Unesco/FAO workshop on university curricula in fishery science, Paris, May 1980 Available in Arabic, English, French, Russian and Spanish	1981
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17	The coastal ecosystems of West Africa: coastal lagoons, estuaries and mangroves A workshop report, Dakar, 11-15 June 1979 Available in English and French	1981
18	Coral reef management in Asia and the Pacific: some research and training priorities Report of a Unesco workshop held in Manila, Philippines 21-22 May 1981 English only	1982
19	Mareas rojas en el Plancton del Pacífico Oriental Informe del Segundo Taller del Programa de Plancton del Pacífico Oriental, Instituto del Mar, Callao, Perú 19-20 de noviembre de 1981 Spanish only	1982
20	Quantitative analysis and simulation of Mediterranean coastal ecosystems: The Gulf of Naples, a case study Report of a workshop on ecosystem modelling Ischia, Naples, Italy, 28 March to 10 April 1981 Organized by the United Nations, Educational, Scientific and Cultural Organization (Unesco) and the Stazione Zoologica, Naples English only	1983
21	Comparing coral reef survey methods A regional Unesco/UNEP workshop, Phuket Marine Biological Centre, Thailand, December 1982 English only	1983
22	Guidelines for marine biological reference collections Prepared in response to a recommendation by a meeting of experts from the Mediterranean Arab countries Available in English, French and Arabic	1983
23	Coral reefs, seagrass beds and mangroves: their interaction in the coastal zones of the Caribbean Report of a workshop held at West Indies Laboratory, St. Croix, U.S. Virgin Islands, May, 1982 English only	1983
24	Coastal ecosystems of Latin America and the Caribbean The objectives, priorities and activities of Unesco's COMAR project for the Latin America and Caribbean region Caracas, Venezuela, 15-19 November 1982 Available in English and Spanish	1983
25	Ocean engineering teaching at the university level Recommended guidelines from the Unesco/IOC/ECOR workshop on advanced university curricula in ocean engineering and related fields, Paris, October 1982 Available in English, French, Spanish, Russian, Arabic and Chinese	1983

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PREFACE

Unesco Reports in Marine Science are designed to serve specific programme needs and to report on developments in projects conducted by the Unesco Division of Marine Sciences, including those involving collaboration between the Division and the Intergovernmental Oceanographic Commission, particularly in the field of training, education, and mutual assistance in the marine sciences.

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ABSTRACT

The results of this survey show that the field of ocean engineering is well defined and global in extent. At least 97 academic institutions in 19 countries were found to have ocean engineering postgraduate curricula. Another 21 universities and an additional 7 countries may have postgraduate curricula in ocean engineering. The probability is great that even the latter numbers may be conservative because detailed information is lacking from some countries that might have comparable curricula. Ocean engineering is included in curricula at both undergraduate and postgraduate levels in industrializing and industrialized countries. In terms of numbers of universities having curricula, the top 4 countries are the United States with 25 universities, the United Kingdom with 14, and Japan and China with 11 and 10 respectively. All other countries had 5 or fewer universities with postgraduate ocean engineering curricula.

Ocean engineering, as exemplified by the curricula in the institutions surveyed, includes the subfields of harbour and coastal engineering, offshore engineering, marine technology, and the more traditional fields of naval architecture and marine engineering. A number of institutions in industrializing countries are following the example of many institutions in the industrialized countries by changing the name of a department of naval architecture or naval architecture and marine engineering to a department of ocean engineering. This reflects the modern convention that ocean engineering is the more encompassing term. Although the term 'marine technology' is sometimes used, this designation for ocean engineering was rarely used by the institutions surveyed. Clearly, the all-inclusive term that is used worldwide for academic curricula covering engineering activities in harbours, coasts, seas, or oceans is ocean engineering. This term also is in very widespread use in national governments and industry.

Most postgraduate degrees are designated in one of the traditional engineering fields (e.g. Master of Science in Civil Engineering) or undesignated by discipline (e.g. Master of Science). However, in the United Kingdom, the United States and a few other countries, a number of institutions have curricula in which postgraduate degrees are designated specifically in ocean engineering (e.g. Master of Science in Ocean Engineering).

There exists a definite similarity of subjects or courses included in most ocean engineering curricula. Subjects common in three subfields of ocean engineering (harbour and coastal, offshore, and naval architecture and marine engineering combined) are identified and approximately ranked according to their frequency of occurence in the corresponding curricula.

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The Unesco Division of Marine Sciences was formally asked at the Second Session of the Working Committee for Training, Education and Mutual Assistance (TEMA) of the Intergovernmental Oceanographic Commission (IOC), held at the United Nations, New York, in 1977, to explore how TEMA-related ocean engineering and marine technology activities could most effectively be organized under TEMA and made available to IOC Member States. Since that time, a number of activities have been undertaken as a result of this request.

One of these activities is this report, which was prepared with the following objectives: (1) to survey what universities have ocean engineering curricula, (2) to obtain information on the nature of these curricula, (3) to determine the similarity of curricula by noting the frequency of occurrence of specific courses or subjects in the curricula surveyed, and (4) to serve as a main working document for a workshop on ocean engineering teaching at the university level. (This workshop was held at Unesco, Paris, in October 1982 and its results are given in Unesco Reports in Marine Science 25).

'Ocean engineering' has been used in a broad sense to include harbour and coastal engineering, open ocean or offshore engineering, and marine technology, as well as the traditional fields of naval architecture and marine engineering. The survey has shown that there are variant names of ocean engineering, such as oceanographic engineering, applied marine science, fisheries technology or engineering, hydrographic surveying, etc., which also have been included in this compilation, It will be shown later that the words 'ocean engineering' are generally used throughout the world to include the various disciplines and subjects indicated above.

The word 'university' has been used as a convenient way of referring to any educational institution that is understood to provide recognized teaching programmes in any field of ocean engineering at the postgraduate level. The word 'university' herein is expanded to include polytechnic institutes, institutes of technology, etc. 'Curriculum' is defined as the organized set of knowledge, skills and attitudes to be imparted to students, and the educational activities to achieve this goal. While some information has been given on undergraduate curricula in Annex I, emphasis has been placed on postgraduate curricula throughout the world; i.e., curricula offered to students who have obtained their first university degree.

One of the controversial topics for any applied field of education, such as ocean engineering in the broadest sense, is what percentage of instruction should be devoted to advanced-level courses in a fundamental engineering discipline as opposed to postgraduate courses more representative of the specialization. No

attempt has been made to answer this particular question. Suffice it to say that a substantial number of university educators, as well as employers, believe that students should be well educated in fundamental subjects at the postgraduate level as well as in speciality subjects, particularly those concerned with the ocean environment.

In a survey of this type, one is dependent on too many people to thank each personally for their assistance. This compilation would have been extremely difficult without their help. The following individuals are mentioned because of the particular contribution they made to the project: Dr. Wayne Burt, London Office of (U.S.) Naval Research, canvassed British institutions for the project. Prof. Francisco Giuliani, Centre of Ocean Engineering of the Argentine Government, translated many letters, documents, and university catalogues written in Spanish and provided advice on Central and South American university curricula. Dipl.-Ing. H. U. Oebius, Versuchsanstalt für Wasserbau and Schiffbau in Berlin, kindly made available a manuscript on marine technology in the Federal Republic of Germany and provided considerable additional material on German universities. Mr. D. Taylor Smith, University College of North Wales, asked Miss Angela Garner to communicate with the compilers about her survey of marine education in the United Kingdom. She sent copies of the first and second editions. Prof. Bruce Denness, University of Newcastle upon Tyne, also sent a photocopy of the Garner et al. report. Prof. R. Silvester, University of Western Australia supplied information on coastal engineering curricula in Australian universities. Prof. Shui-Hwa Hu, Tongi University, and Prof. Ming-wei Lu, Shanghai Jiao Tong University, provided information in English and Chinese on curricula in China. Prof. H. Y. Fang, Lehigh University, helped translate from Chinese into English. Prof. Shigeyasu Okusa, Tokai University, furnished an extensive compilation on Japanese universities and translated much information from Japanese into English. Mr. Donald Keach, Engineering Committee on Oceanic Resources (ECOR), telexed ECOR representatives to collect and submit information from their respective countries. Prof. John Herbich, Texas A&M University, made available copies of his publications on ocean engineering in the United States. Dr. Dirk G. Troost, Unesco Division of Marine Sciences, provided documentation and helped in numerous ways. Mrs. Geraldine Dettra, Lehigh University, served as an administrative assistant to this project for two years and typed several draft manuscripts. Information on this report is due in very large measure to all persons named or unnamed who kindly provided assistance. The responsibility for all ommission, errors, or other problems falls upon the authors.

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* Throughout this report, the name United Kingdom of Great Britain and Northern Ireland has been abbreviated for convenience.

METHODS OF DATA COMPILATION

The method of obtaining information for the global survey was to mail two questionnaires to a wide distribution list. The first, or 'specific', questionnaire went to colleagues and institutions where ocean engineering curricula were known or suspected to exist. The second, or 'general', questionnaire was mailed to Unesco contacts and other persons and institutions in those countries about which little or no first-hand knowledge of ocean engineering curricula was available. One additional letter asking for further information was sent to each institution listed, if there was any uncertainty that the information organized into the standard format (Table 1) was complete or correct. Any corrections and/or additional information received later were added to the compilation.

Table 1. Standard format for responding universities.

I.	University Address Country
II.	Name of department or subdivision of university, offering programme or course A. Degrees offered B. Name of programme head or director
III.	Name of programme A. Prerequisites to enter programme B. Degree requirements (separately for each degree) C. Options or information
IV.	Postgraduate courses or subjects (credits)

It is believed that the global coverage of all postgraduate-level ocean engineering disciplines, other than possibly for naval architecture and marine engineering and except as noted below, is reasonably complete. There is less certainty that the coverage of naval architecture and marine engineering postgraduate curricula is as complete. The principal difficulty is that these curricula in many countries are at the undergraduate or first

university degree level. They may range in length from three to seven years. The problem is further compounded by the fact that some of these degrees are equivalent to postgraduate degrees elsewhere. Nevertheless, an effort was made to include as many curricula as could be identified. Unfortunately, detailed information for the compilation was not received from the Union of Soviet Socialist Republics or eastern European countries, although questionnaires were sent to various addresses in these countries.

A number of additional sources of information were used in preparing this report or for obtaining names and addresses. The 'Marine Affairs: Registry of Courses and Training Programmes' by the United Nations (1976) was an exceptionally helpful source of institutions and addresses, although somewhat out of date. For the United States of America, the 'University Curricula in the Marine Sciences and Related Fields' (1979) includes most of the institutions having curricula in ocean engineering. For the United Kingdom, Garner et al. (1982) name institutions having ocean engineering curricula. For the Federal Republic of Germany, an unpublished compendium, 'Meerestechnik in der Bundesrepublik Deutschland', by H. U. Oebius was consulted. Examined but not used were three reports: (1) Comisión Permanente del Pacífico Sur (1977), (2) Unesco (1979), and (3) Norwegian National Committee for ECOR (1981).

Relevant information received in response to the questionnaires and from other sources up to mid-1982 was organized following a standardized format (Table I), which was slightly revised in 1982. Annex I gives the collected information following this format. Primary sources of information have been used wherever possible. The amount of information received ranged from the fact that an ocean engineering postgraduate curriculum existed, or probably existed, at a particular institution of higher learning to information in considerable detail. When specific information for entries in the standard format was lacking, this has been indicated by the word 'unknown'. Information on institutions believed to have relevant programmes, or developing programmes, that was received after mid-1982 is listed in Annex II. This information has not been included in Tables 6, 7, and 8. It is noteworthy that the Heriot-Watt University, Edinburgh, and a few other well know institutions, did not report postgraduate curricula during the time this report was written.

If the institution reported having both undergraduate and postgraduate ocean engineering curricula, this information was noted under the category of degrees offered (II.A., Annex I); however, further details of any undergraduate curricula are not presented. Although each institution was requested to send information on both undergraduate and postgraduate ocean engineering curricula, there may be instances when information on an undergraduate curriculum was not submitted.

All entries under the name of programme (category III, Annex I) refer only to postgraduate curricula. Curricula names shown in quotation marks were given by the authors of this report and not by the institution. Under degree requirements (III. B., Annex I), it was assumed that almost every programme or curriculum required examinations; consequently, information on the number and

type of examinations generally has not been included. The options or information category (III. C., Annex I) has been used in two different ways: (1) sometimes true options to the curriculum were known, in which case they are listed; and (2) certain relevant information bearing on the curriculum was included that could have been listed under a miscellaneous category.

The word 'course' has different connotations in different countries. The common use of the word in the United States has been followed. A course or subject in this report refers to a series of lectures, laboratories, etc. dealing with a limited area of knowledge. In the United Kingdom and some other countries, a course most often refers to the total number of subjects of study in a curriculum. In some universities, apparently it is not common to specify the individual courses or subjects comprising a course of study or a curriculum. Nevertheless, an effort has been made to specify either the titled courses comprising a curriculum or the subject matter, if it is known and if specific courses are unknown. Only postgraduate courses have been listed. Wherever possible, an indication of the amount of academic credit given for each course or subject also is included.

RESULTS OF THE SURVEY

Annex I lists 97 universities in 19 countries that have postgraduate curricula in some field of ocean engineering, the location of these universities is shown in Figure 1. This number includes two French and one Swedish that are believed to have relevant curricula. For some countries, such as Japan and the United Kingdom, the symbol marking the location of the country is accompanied by the number of universities located within that country. Table 2 summarizes information contained in Annex I in terms of how curricula and degrees were actually designated by the respondent universities.

Table 3 presents the curricula designations by decreasing frequency of usage and by percentage. The term 'ocean engineering' clearly is favoured in curriculum designation, accounting for about 29% of the responses. However, it should be recalled that Annex I (and Table 2) probably under-reports designations in naval architecture, which in actuality may be as common or more common than ocean engineering. This is not surprising considering the length of time that naval architecture curricula have been in existence. It can also be concluded that the term 'marine technology' is rarely used compared to the other designations.

Figure 1. Map showing approximate distribution of 97 academic institutions which have post-graduate curricula in one or more fields of ocean engineering.

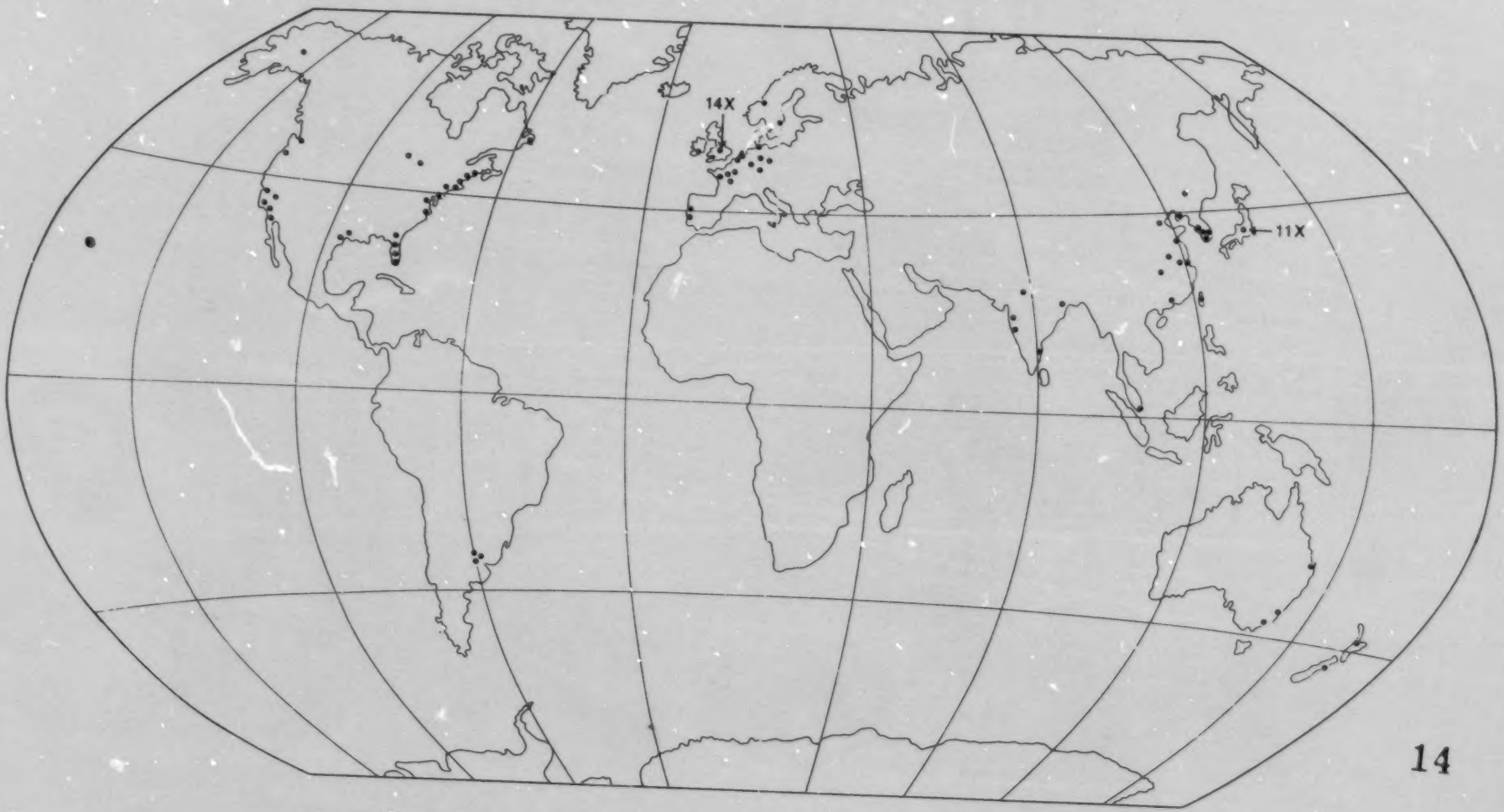

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Table 2. Summary of post-graduate ocean engineering curricula[1]

Country	Institution	Curriculum Designation[2]							Post-graduate Degrees Offered In[3]					
		Harbour and (or) Coastal Engineering	Offshore Engineering	Ocean Engineering	Marine Technology	Naval Architecture	Marine Engineering	Other Related Field	Ocean Engineering[4]	Naval Architecture	Marine Engineering	Traditional Engineering Discipline or Undesignated[5]	Unknown, Uncertain or Other
Argentina	Instituto Tecnológico de Buenos Aires					•				•			
	Universidad de Buenos Aires					•				•			
	Universidad de Buenos Aires	•											•
Australia	University of New South Wales	•				•						•	
	University of Queensland	•										•	
	University of Sydney		•									•	
Canada	Memorial University of Newfoundland			•					•				
China	Dalian Institute of Technology	•	•			•	•					•	
	East China Tech. Univ. of Water Resources	•										•	
	Harbin Shipbuilding Engineering Institute					•		•				•	
	Hwa-Chong Institute of Technology					•	•					•	
	Nat'l Taiwan College of Marine Sci. & Tech.	•		•								•	
	Shandong College of Oceanography			•								•	
	Shanghai Jiao Tong University			•								•	
	South China Institute of Technology					•	•					•	
	Tianjin University	•	•									•	
	Tongji University			•					•				
Denmark	Danmarks Tekniske Højskole			•					•				
Federal Rep. of Germany	Rhein.-Westfäl. Tech. Hochs. Aachen			•		•				•		•	
	Technische Universität Berlin			•								•	
	Technische Universität Clausthal			•								•	
	Universität Hamburg					•						•	
	Universität Hannover			•								•	
France	Ecole Centrale des Arts et Manuf.			•				•				•	
	École Nationale des Ponts et Chaussées	•											•
	Ecole Nationale Supér. de Tech. Avancées		•			•	•						•
	Université de Nantes					•						•	
India	Indian Institute of Technology, Bombay		•									•	
	Indian Institute of Technology, Delhi		•					•				•	
	Indian Institute of Technology, Kharagpur				•		•						•
	Indian Institute of Technology, Madras			•								•	
	Karnataka Regional Engineering College							•				•	
Ireland	University College Cork	•	•									•	
Japan	Ehime University			•								•	
	Hiroshima University							•				•	
	Kagoshima University			•								•	
	Kyushu University					•						•	
	Nihon University					•	•					•	
	Osaka University					•						•	
	Tokai University			•								•	
	Tokyo University of Fisheries							•					•
	University of Osaka Prefecture					•						•	
	University of Tokyo					•	•					•	
	Yokohama National University			•		•						•	
Netherlands	Internat'l Inst. Hydraulic & Envir. Eng.	•											•
	Technische Hogeschool Delft	•				•						•	
New Zealand	University of Auckland	•	•									•	
	University of Canterbury	•										•	
Norway	Norges Tekniske Høgskole	•			•							•	
Portugal	Instituto Hidrográfico							•					•
	Instituto Superior Técnico					•			•				

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Country	Institution	Curriculum Designation[2]							Post-graduate Degrees Offered In[3]				
		Harbour and (or) Coastal Engineering	Offshore Engineering	Ocean Engineering	Marine Technology	Naval Architecture	Marine Engineering	Other Related Field	Ocean Engineering[4]	Naval Architecture	Marine Engineering	Traditional Engineering Discipline[5] or Undesignated[5]	Unknown, Uncertain or Other
Republic of Korea	Busan National University					•						•	
	Inha University					•						•	
	Ulsan Institute of Technology					•						•	
	Seoul National University					•						•	
Singapore	National University of Singapore	•										•	
Sweden	Chalmers Tekniska Hogskole				•	•						•	
	Royal Institute of Technology					•							•
United Kingdom of Great Britain and N. Ireland	Cranfield Institute of Technology		•						•				
	Glasgow College of Technology		•						•				
	Liverpool Polytechnic							•					•
	Newcastle upon Tyne Polytechnic		•										•
	Plymouth Polytechnic							•					•
	Robert Gordon's Inst. of Technology		•						•			•	
	Royal Naval Engineering College						•					•	
	University College London			•		•	•			•	•	•	
	University College of North Wales							•				•	
	University of Glasgow			•		•						•	
	University of Liverpool							•				•	
	University of Manchester							•				•	
	University of Newcastle upon Tyne				•						•	•	•
	University of Strathclyde	•			•			•				•	•
United States of America	California State Polytechnic University			•								•	
	California State University, Long Beach			•								•	
	Florida Atlantic University			•								•	
	Florida Institute of Technology			•					•				
	Massachusetts Institute of Technology			•		•	•	•	•			•	
	North Carolina State University	•		•								•	
	Oregon State University			•					•			•	
	Stevens Institute of Technology			•								•	
	Texas A&M University			•					•			•	
	University of Alaska, Fairbanks			•					•				
	University of California, Berkeley		•			•		•				•	
	University of San Diego							•				•	
	University of Delaware			•								•	
	University of Florida	•		•								•	
	University of Hawaii at Manoa			•								•	
	University of Miami			•					•				•
	University of Michigan					•	•			•	•	•	
	University of New Hampshire							•				•	
	University of Rhode Island			•								•	
	University of Southern California			•					•				
	University of Texas at Austin			•								•	
	University of Washington			•								•	
	University of Wisconsin-Madison			•								•	
	Virginia Polytechnic Institute			•								•	
	Woods Hole Oceanographic Institution			•								•	
	Totals:	**18**	**13**	**39**	**5**	**31**	**12**	**17**	**13**	**6**	**3**	**74**	**14**

1. Data are from Annex I.
2. Curriculum designations have been generalised where necessary.
3. Post-graduate degrees offered are Diploma, Master's Degree, Doctor's Degree or equivalent.
4. Post-graduate degrees offered in ocean engineering include coastal and offshore engineering, marine technology, etc., but not naval architecture or marine engineering.
5. An example of a traditional engineering degree is Master of Science in Civil Engineering; an undesignated degree would be Master of Science.

Table 3. Summary of curricula designations*.

Designation	Times Used	Percentage
Ocean engineering	39	29
Naval architecture	31	23
Harbour and (or) coastal engineering	18	13
'Other related fields' (miscellaneous)	17	12
Offshore engineering	13	10
Marine engineering	12	09
Marine technology	05	04
	135	100

* Data from Table 2.

Table 4 summarizes degree designations from Table 2. It will be observed that in all of the countries more universities designate the postgraduate degree resulting from an ocean engineering curriculum in terms of traditional engineering degrees, such as Master of Science in Civil Engineering, or without designation, such as Master of Science. Far fewer universities specifically refer to their postgraduate degree with an ocean engineering designation, such as Master of Ocean Engineering.

Table 4 succintly shows that of the 97 institutions in 19 countries having identified curricula in some field of ocean engineering, 25 universities or 25% of the total are in the United States, 14 or 14% are in the United Kingdom and Japan is credited with 11 or 11% of the total and China with 10 or 10%. None of the other countries are reported to have more than 5 universities with these curricula. One country having two universities with ocean engineering curricula was not included because of Unesco policy. The numbers or percentages will change slightly if most or all of the universities listed in Annex II are eventually determined to have postgraduate curricula. Assuming that all universities listed in Annex II really do have postgraduate curricula, which may or may not be a valid assumption, Table 5 recalculates a revised number of countries (26) and universities (118). The main point, whichever table is preferred, is that ocean engineering curricula are found in universities located throughout the world. Furthermore, these institutions are located both in the industrialized and industrializing nations.

Table 4. Summary of postgraduate degree designation by country [1/]

Country	Number of Institutions	Degrees Designated In: Specific Ocean Engineering Fields [2/]	Naval Architecture or Marine Engineering	Traditional Engin. Discipline or Undesignated [3/]	Unknown, Uncertain or Other
Argentina	3		2	1	1
Australia	3			3	
Canada	1	1			
China	10	1		9	
Denmark	1	1			
Fed. Rep. Germany	5		1	5	
France	4			2	2
India	5			4	1
Ireland	1			1	
Japan	11			10	1
Netherlands	2			1	1
New Zealand	2			2	
Norway	1			1	
Portugal	2		1		1
Republic of Korea	4			4	
Singapore	1			1	
Sweden	2			1	1
United Kingdom	14	3	3	9	5
United States	25	7	2	21	1
Totals: 19	97	13	9	74	14

1/ Data from Table 2.
2/ Includes harbour and coastal engineering, offshore engineering, ocean engineering and marine technology.
3/ An example of a traditional engineering degree is Master of Science in Civil Engineering; an undesignated degree would be Master of Science.

Table 5. Revised Table 4, assuming all institutions in Annex II have valid postgraduate ocean engineering curricula

Country	Number of Institutions	Percentage *
Argentina	3	2 +
Australia	4	3
Brazil	3	2 +
Canada	1	1
China	12	10
Denmark	1	1
Federal Republic of Germany	5	4
France	4	3
German Democratic Republic	1	1
India	5	4
Italy	3	2 +
Ireland	1	1
Japan	11	9
Netherlands	2	2
New Zealand	2	2
Norway	1	1
Portugal	2	2
Republic of Korea	4	3
Saudi Arabia	1	1
Singapore	1	1
Spain	1	1
Sweden	2	2
Thailand	1	1
U. S. S. R.	5	4
United Kingdom	14	12
United States of America	28	24
Totals: 26	118	100

* The three 'pluses' equal 1.

SIMILARITIES OF UNIVERSITY CURRICULA

One of the objectives of this study was to investigate the similarities or commonality of subjects in the curricula of different universities that are located in different countries. A simple compilation was undertaken of the courses most often cited in similar curricula. The method chosen consisted of counting the number of courses or subjects having similar names or descriptions in all similar curricula listed in Annex I. The compilations obviously are subjective because of the need to try and group like subjects together to reduce the large number of entries as much as possible. The total number of courses or subjects having similar names or descriptions is also influenced by the fact that some of the university curricula tended to emphasize a limited number of subjects and to offer many courses or subjects having the same name. A number of small modifications of curricula, and a few new curricula, are included in Annex I that are not included in this analysis, which was completed before the modifications were made or the new material was available. As a consequence, the number of course or subject citations that were counted and reported should be considered only approximate. The data may be in error by 20%; nevertheless, it is believed that the general trends may be useful and of interest.

To simplify the results, data for three curricula were separately tabulated. One compilation includes subjects or courses in harbour and coastal engineering. A second compilation includes the 'blue-water' fields of offshore engineering, ocean engineering (in a restricted sense) and marine technology. A third compilation is for naval architecture and marine engineering combined. In all of these curricula selected for presentation in the following tables, there were a large number of courses or subjects cited too infrequently to warrant grouping. A scanning of the listings in Annex I will indicate the broad range.

Table 6 summarizes postgraduate courses or subjects most often cited in coastal and harbour engineering curricula. Far fewer subjects are included in this table, compared to Tables 7 and 8. Relative rankings between courses cited 10 times or less are only approximate, for reasons previously mentioned.

The data in Table 6 are fewer in number than in Tables 7 and 8. These data indicate that the most commonly offered courses are in hydraulics, particularly in estuarine or coastal hydraulics; coastal engineering; structures; and waves, both short and long (tides). There appears to be a greater need for higher mathematics in this curriculum than in the other two.

Table 6. Course or subjects most often cited in postgraduate harbour and coastal engineering curricula[1/]

Times Cited [2/]	Course or Subject
20	Hydraulics; Estuarine and Coastal Hydraulics
16	Coastal Engineering
12	Structures
10	Waves
9	Planning and Design of Harbours and Coastal Structures
8	Advanced Mathematics, Statistics, Analysis
7	Hydrodynamics
6	Hydrology, Groundwater, etc.
6	Soils and Foundations

1/ Data from institutions listed in Annex I.

2/ The ranking is subjective, and only general trends should be considered; the 'times cited' figure may be subject to an error of 20%; courses or subjects cited about four times or less are excluded.

Table 7 summarizes postgraduate courses or subjects most commonly cited in ocean and offshore engineering and marine technology. In this table, the number of structural subject citations is appreciably larger than the second-ranked category. Furthermore, a very large variety of structure courses were listed in the various curricula, making this title much less precise than for the courses cited fewer times. Because of the considerable number of subjects listed less than 10 times, these were not presented in Table 7.

The data in Table 7, indicate that the most common courses are in structures, ocean engineering, acoustics, soils and foundations (marine geotechnology), and hydrodynamics. Courses in acoustics are more often taught in universities in the United States than in other countries. This may be because of the traditional close relationship between marine science or oceanography and ocean engineering in the U. S. institutions. Courses in marine geotechnics frequently specified dynamic or cyclic properties, reflecting the need to understand the effects of environmental loads, such as waves and earthquakes, on the soils and soil-structure interaction.

Table 7. Courses or subjects most often cited in postgraduate ocean engineering and offshore engineering curricula[1/]

Times Cited[2/]	Course or Subject	Further Elaboration Sometimes Used in Course Descriptions[3/]
50	Structures	Analysis, Construction & Maintenance, Design, Dynamics
30-40	Acoustics	
	Ocean Engineering	Offshore Technology
	Soils and Foundations	Behaviour, Design, Dynamics
20-30	Hydrodynamics	
10-20	Physical Oceanography	
	Economics, Marketing, Management, etc.	Decisions, Development, Planning
	Waves	
	Coastal Engineering	Facilities, Processes
	Marine or Engineering Geology	Submarine Geology
	Fluid Mechanics	
	Corrosion	
	Shore Erosion and Processes; Sediment Transport	
	Materials	Fatigue, Fracture
	Measurements and Data Analysis	Data Trasmission, Systems
	Instrumentation	
	Meterology & Environmental Loads	
	Numerical Methods	Analysis, Modeling

1/ Data from institutions listed in Annex I.

2/ The ranking is subjective, and only general trends should be considered; the 'times cited' figure may be subject to an error of 20%; within each category, courses or subjects are listed in approximate decreasing frequency of occurrence; courses or subjects cited less than about 10 times are excluded.

3/ Courses or subjects are also used without any modifiers in many curricula.

Table 8 summarizes the courses most often cited in naval architecture and marine engineering curricula. The curricula in marine engineering were fewer in number than for naval architecture; consequently, the two curricula were combined for this table. Within each grouping, the relative ranking of courses or subjects should be considered only as approximate.

Table 8. Courses or subjects most often cited in postgraduate naval architecture and marine engineering curricula[1/]

Times Cited[2/]	Courses or Subjects
>30	Ship or Naval Hydrodynamics
25-30	Ship Design
10-20	Ship Propulsion and Resistance Ship Motion and Stability Computers, Automation, Control Ship Structures Ship Vibration Marine Engineering Ocean Structures
5-10	Structural Analysis or Engineering Ocean Engineering Ship Construction or Facilities Welding Ship Power Systems or Electrical Engineering Fracture or Strength of Materials Naval Architecture Systems Design or Engineering Ship Dynamics

1/ Data from institutions listed in Annex I.

2/ The ranking is subjective, and only general trends should be considered; the 'times cited' figure may be subject to an error of 20%; within each category, courses or subjects are listed in approximate decreasing frequency of occurrence. Courses or subjects cited less than about five times are excluded.

In Table 8, the most common courses are in ship or naval hydrodynamics and ship design. It was interesting to note that many more curricula had courses entitled marine engineering than naval architecture. This observation probably reflects the fact that there are more curricula in naval architecture than marine engineering and that, consequently, there is a need for naval architects to become familiar with the subject of marine engineering.

The subject of curricula in ocean engineering in general, and a number of subfields in particular, is discussed in greater detail in the companion report: 'Ocean engineering teaching at the university level', Unesco Reports in Marine Science 25. That report presents results of a workshop on this subject and provides a more exhaustive treatment of curriculum design.

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Garner A., and M. Stone. 1982. Marine education in Britain, a survey. In: E. M. Borgese and N. Ginsburg, eds. Ocean Yearbook 3. University of Chicago Press, Chicago. 672 p.

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Unesco, 1979. Syllabus for training marine technicians. Report of an IOC/Unesco workshop, Miami, Florida, May 1978. Unesco Reports in Marine Science 4. Unesco, Paris. 50 p.

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University Curricula in the Marine Sciences and Related Fields. (1979). Academic Years 1979-1980, 1980-1981. National Oceanic and Atmospheric Administration, National Sea Grant Programme, Washington. 285 p.

Annex I. List of universities having postgraduate curricula in ocean engineering.

I. Instituto Tecnologico de Buenos Aires
(Institute of Technology of Buenos Aires)
Av. Eduardo Madero 351/399
1106 Buenos Aires
Argentina

II. Unknown
A. Ingeniero Naval
B. Unknown

III. Naval Engineering
A. Diploma de Bachiller
B. Unknown
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
Naval Architecture I
Naval Architecture II
Marine Propulsion Plants
Ship Structure
Merchant Naval Construction
Military Naval Construction
Naval Systems I
Naval Systems II
Ship Design I
Ship Design II

I. Universidad de Buenos Aires
(University of Buenos Aires)
Paseo Colón 850
1063 Buenos Aires
Argentina

II. Facultad de Ingeniería
A. Ingeniero Naval
B. Ing. Germán Frias

III. Naval Engineering
A. Diploma de Bachiller
B. Unknown
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
53 01 Naval Architecture I
02 Naval Architecture II
03 Marine Engines I
04 Marine Engines II
05 Auxiliary Marine Engines
06 Naval Construction
07 Military Naval Construction
08 Ship Structure
09 Ship Installation and Systems
10 Ship Design
11 Marine Propulsion Plants

I. Universidad de Buenos Aires
(University of Buenos Aires)
Department of Transportation
Faculty of Engineering
Av. Las Heras 2214, 2° piso
1127 Buenos Aires
Argentina

II. Port Engineering Graduate School
A. Unknown
B. Ing. Sanguinetti

III. Port Engineering
A. Civil Engineering Degree
B. Unknown
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
Maritime Hydraulics
River Hydraulics
Hydrography
Dredging
Port Works
Port Design and Model Tests
Port Systems and Installations
Port Economics and Legal Affairs

I. The University of New South Wales
Box 1, P.O.
Kensington, New South Wales 2033
Australia

IIa. School of Civil Engineering
A. Master of Engineering Science
B. Professor I.K. Lee

IIb. School of Mechanical and Industrial Engineering (MIE)
School of Electrical Engineering and Computer Science (ECS)
A. Degrees Offered
1. Undergraduate
Bachelor of Engineering (Naval Architecture, MIE) and
Bachelor of Engineering (ECS)
2. Postgraduate
Master of Engineering Science (MIE and ECS); Master of Engineering; Doctor of Philosophy
B. Associate Professor G. de Vahl Davis (MIE) and
Professor N. W. Rees (ECS)

IIIa. Coastal Engineering
A. Bachelor of Engineering
B. 36 credits, over a minimum of one year full-time or two years part-time; research project of 9 credits
C. Options or Information: none

IIIb. Naval Architecture (MIE)
Radar and Navigation Aids, Modelling and Control (ECS)
A. Bachelor's degree with honours or equivalent in appropriate area
B. Degree Requirements
1. Master of Engineering
Science: 1 year full time combination of course work and research: 36 credits
2. Master of Engineering: two years full time research
3. Doctor of Philosophy: three years full time research
C. Options or Information: none

IVa. Postgraduate Courses or Subjects (each 3 credits)
8.835G Coastal Engineering I
8.836G Coastal Engineering II
8.863G Estuarine Hydraulics
8.909G Project (a thesis on a research project)
Other subjects from the areas of structural, materials, contruction or water engineering

IVb. Postgraduate Courses or Subjects (credits)
5.912G Naval Hydrodynamics I (2)
5.913G Naval Hydrodynamics II (2)
6.164G Microwave Antenna Theory and Application (3)
6.167G Propagation and Transmission of Electromagnetic Waves (3)
6.349G Radar and Navigation Aids (3)
6.460G Real Time Computing and Simulation (3)
6.453G System Identification and Modelling (3)

I. University of Queensland
St. Lucia, Queensland 4067
Australia

II. Department of Civil Engineering
A. Master of Engineering Science
B. Professor C. O'Connor

III. Coastal Hydraulics
A. Bachelor of Engineering with first or second class honours or equivalent - including fields other than engineering
B. Research or course-work program; thesis
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
Relevant to ocean, coastal, or offshore engineering
E 2821 Hydraulic Analysis
E 2822 Hydraulic Design
E 2824 Coastal Hydraulics
E 2826 Movable Boundary Hydraulics
E 2827 Water and Wastewater Engineering

I. The University of Sydney
Sydney, New South Wales 2006
Australia

II. School of Civil Engineering
A. Degrees Offered
1. Master of Engineering
2. Doctor of Philosophy
B. Professor E. H. Davis

III. Offshore Engineering (structural or geotechnical)
A. Honours degree in Civil Engineering, or Pass Degree plus suitable practical experience
B. Degree Requirements
1. Master of Engineering Science: either solely by research, or by combination of formal coursework (2/3) and thesis/project (1/3)
2. Doctor of Philosophy: solely by research
C. Options or Information: research in the following areas
1. Corrosion fatigue in reinforced concrete
2. Fatigue of tubular steel joints
3. Lateral loading of pile foundations
4. Cyclic loading of pile foundations

IV. Postgraduate Courses or Subjects
The following lectures given in the Master of Engineering Science course form part of a 2-unit course:
Offshore Site Investigation
Behaviour of Soils under Cyclic Loading
Foundation Design for Offshore Gravity Structures
Design of Offshore Pile Foundations
Other courses for the Master of Engineering Science include material relevant to the loading of offshore structures, and to their structural behaviour, analysis and design.

I. Memorial University of Newfoundland
St. John's, Newfoundland A1B 3X5
Canada

II. Ocean Engineering Group
A. Master of Engineering and Doctor of Philosophy in Ocean Engineering
B. Dr. T. R. Chari

III. Ocean Engineering
A. An engineering degree with a "B" undergraduate grade-point average
B. Degree Requirements
1. Master of Engineering
a. Course-based (professionally oriented): 6 core courses, 4 elective courses, and a project; ocean-related field experience
b. Research-oriented: 6 graduate courses; thesis
2. Doctor of Philosophy: no formal course requirements; thesis
C. Options or Information: current research areas
1. Ocean Geotechnology
2. Ocean Acoustics, Communication, and Telemetry
3. Ice and Icebergs
4. Ocean Structures

IV. Postgraduate Courses or Subjects
A. Core courses

Eng. 9044	Corrosion in Aqueous Media
Eng. 9091	Advanced Statistical Analysis
Eng. 9114	Ocean Instrumentation and Equipment
Eng. 9210	Ice Engineering I - Materials
Eng. 9230	Engineering Analysis
Physics 6310	Oceanography

B. Elective courses

Eng. 9025	Offshore Soil Mechanics
Eng. 9026	Foundations for Marine Structures
Eng. 9053	Momentum, Heat and Mass Transfer
Eng. 9068	State and Parameter Estimation for Dynamic Engineering Systems
Eng. 9080	Structural Dynamics
Eng. 9082	Ocean Engineering Structures
Eng. 9084	Experimental Mechanics
Eng. 9104	Random Signal Processing
Eng. 9112	Ocean Acoustics
Eng. 9151	Finite Element Analysis
Eng. 9201	Similarity and Model Techniques
Eng. 9240	Antennas and Propagation Engineering
Eng. 9301	Marine Hydrodynamics I

C. Other

Eng. 9400	Ocean Engineering Professional Project
Eng. 9401	Field Experience

I. Dalian Institute of Technology
Dalian 116024
China

IIa. Department of Hydraulic Engineering
A. Degrees Offered
1. Bachelor of Science in Offshore Civil Engineering or Harbour and Coastal Engineering
2. Master of Science in Engineering
B. Name of Program Head or Director
1. Offshore Civil Engineering Program: Professor Wen-Fa Lu
2. Harbour and Coastal Engineering Program: Professor Da-Hone Qiu

IIb. Department of Naval Architecture and Marine Engineering
A. Master of Science in Engineering
B. Name of Program Head or Director
1. Naval Architecture Program: Professor Ji-Sheng Jiang
2. Marine Engineering Program: Professor Guo-Dong Hu

IIIa. Offshore Engineering, Harbour and Coastal Engineering
A. Bachelor of Science degree in engineering; entrance examination
B. 40 credit hours in advanced subjects; thesis (two years normal)
C. Options or Information: none

IIIb. Naval Architecture and Marine Engineering
A. Bachelor of Science degree in engineering; entrance examination
B. 40 credit hours in advanced subjects; thesis (two years normal)
C. Options or Information: none

IVa. Postgraduate Courses or Subjects (credits)
A. Basic Courses
Foreign Language (3)
Natural Dialectics (3)
Linear Algebra (3)
Functions of Complex Variables (3)
Equations of Mathematics and Physics (3)
Theory of Probability and Statistics (3)
Computational Methods (3)
Experimental Techniques (3)
B. Offshore Civil Engineering Program
Hydrodynamics (3)
Physical and Geological Oceanography (3)
Finite Elements Analysis (3)
Advanced Structural Analysis (3)
Dynamics of Structures (3)
Soil Mechanics and Foundation Engineering (3)
Behaviour and Design of Steel Structures (3)
Behaviour and Design of Reinforced Concrete Structures (3)
Analysis and Design of Offshore Structures (4)

C. Harbour and Coastal Engineering Program
Hydrodynamics (3)
Waves and Wave Actions on Structures (3)
Ocean Waves (3)
Finite Elements Analysis (3)
Dynamics of Structures (3)
Seismics Engineering (4)
Advanced Soil Mechanics (4)
Reliability and Safety of Structures (1)

IVb. Postgraduate Courses or Subjects (credits)

A. Basic Courses
Foreign Language (2)
Natural Dialectics (3)
Linear Algebra (3)
Functions of Complex Variables (3)
Equations of Mathematics and Physics (3)
Theory of Probability and Statistics (3)
Computational Methods (3)
Experimental Techniques (3)

B. Naval Architecture Program
Fluid Mechanics (3)
Boundary Layer Theory (3)
Theory of Ship Design (4)
Marine Hydrodynamics (4)
Theory of Waves and Wave Exciting Forces (3)
Theory of the Motions of a Ship or a Moored Buoy in Waves (3)
Finite Elements Analysis in Fluid Dynamics (4)

C. Marine Engineering Program
Fluid Mechanics (3)
Gas Dynamics (3)
Thermodynamics (4)
Heat and Mass Transfer (4)
Combustion Science (4)
Diesel Engine (4)

I. East China Technical University of Water Resources*
Zikang Road 1
Nanjing, Jiangsu Province
China

II. Department of Waterway and Harbour Engineering
A. Degrees Offered
1. Master of Engineering Science
2. Doctor of Engineering Science
B. Name of Program Head or Director
1. Coastal Hydrodynamics, Professor Yen Kai
2. Hydrodynamics and Regulation of Estuary, Professor Hu Yan Ru-Lin

III. Coastal Hydrodynamics, Hydrodynamics and Regulation of Estuary
A. Bachelor's degree with a speciality in Waterway and Harbour Engineering or Coastal and Ocean Engineering
B. Degree Requirements
1. Master of Engineering Science: courses; thesis (two years limit)
2. Doctor of Engineering Science: dissertation (two years limit)
C. Options or Information
1. Coastal Hydrodynamics subject areas
a. Wave Theory and Analysis
b. Coastal Erosion and Sedimentation Problems
c. Wave Action on Structures
2. Hydrodynamics and Regulation of Estuary subject areas
a. Estuarine Hydraulics and Sedimentation
b. Regulation of Estuary

IV. Postgraduate Courses or Subjects (for Master Degree) (hours)
A. Compulsory
Dialectics of Nature (160)
First Foreign Language (500)
Second Foreign Language (200)
Engineering Mathematics (700)
Fluid Mechanics (300)
Coastal Hydrodynamics (350)
River Dynamics** (350)
B. Elective Courses (any two courses)
Computer Applications (120)
Theory of Hydraulic Models (120)
Coastal and Estuarine Engineering (100)
Coastal Morphology (50)

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* Previous names: East China Institute of Hydraulic Engineering and East China College of Hydraulic Engineering
** Course for Program of Hydrodynamics and Regulation of Estuary

I. Harbin Shipbuilding Engineering Institute
Harbin
China

IIa. Department of Naval Architecture
- A. Degrees Offered
  1. Master's Degree
  2. Doctor's Degree
- B. Professor Wei-Yang Li

IIb. Department of Underwater Sound
- A. Degrees Offered
  1. Master's Degree
  2. Doctor's Degree
- B. Professor Shih-o Yang

IIIa. Naval Architecture
- A. Entrance examination
- B. Degree Requirements
  1. Master's Degree: 30 postgraduate credits; dissertation
  2. Doctor's Degree: published papers; dissertation
- C. Options or Information
  1. Marine Hydrodynamics
  2. Ship Resistances and Propulsions
  3. Theory of Seaworthiness
  4. Ship Maneuverability
  5. Ship Structural Analysis and Design

IIIb. Underwater Sound
- A. Entrance examination
- B. Degree Requirements
  1. Master's Degree: 30 postgraduate credits; dissertation
  2. Doctor's Degree: published papers; dissertation
- C. Options or Information
  1. Underwater Sound Array
  2. Propagation of Sound in the Sea
  3. Underwater Sound Signal Processing
  4. Nautical Noise
  5. Underwater Sound Instrument

IVa. Postgraduate Courses or Subjects (credits)
Boundary Layers (3)
Free Surface Hydrodynamics (3)
Stability and Motion Control of Ocean Vehicles (3)
Probabilistic Theory of Ship Dynamics (4)
Selected Topics in Ship Propulsion (3)
The Finite Element Method, Fundamentals and Applications (2)
Theory of Plates and Shells (3)
Ship Structural Design Concepts (4)
Random Vibrations (3)
Hydroelasticity of Ships (3)
Dynamic Analysis of Offshore Structures (2)
Nonlinear Programming and Optimization Techniques (2)
Principles of Naval Ship Design (2)
Projects in System Engineering (2)

IVb. Postgraduate Courses or Subjects (credits)

Underwater Sound
Selected Topics in Acoustics (4)
Theory of Sound Array (3)
Structural Vibration and Sound Radiation (2)
Underwater Sound Transducer (3)
Theory of Wave Propagation in Deterministic Medium (3)
Fluctuation of Sound Field in the Sea (2)
Mechanics of Underwater Noise (3)
Noise Background in the Ocean (3)
Selected Topics in Signal Processing (4)
Adaptive Methods in Underwater Sound (2)
Application of System Engineering in Underwater Sound (2)
Underwater Sound Instruments (3)

I. Hwa-Chong Institute of Technology
Wuhan
China

II. Naval Architecture and Marine Engineering
A. Master of Science in Engineering
B. Unknown

III. Naval Architecture and Marine Engineering
A. Bachelor of Science in Engineering; entrance examination
B. Degree Requirements
34-38 credits in advanced subjects and thesis to be published in an intermediate-level journal
C. Options or Information
1. Naval Architecture
2. Ship Structural Mechanics
3. Ship Electrical Automation
4. Marine Internal Combustion Engines

IV. Postgraduate Courses or Subjects
A. Common Courses
Dialectics of Nature
Foreign Language
Linear Algebra
Field Theory
B. Specialized Courses
Hydrodynamics
Computational Fluid Mechanics
Techniques of Ship Model Test
Short Waves
Wind Waves
Theory of Control
Theory of Viscosity
Theory of Circulation
Theory of Combustion
Theory of Oil Feeding
Theory of Pressure Increase
Gas Turbines
Theory of Elasticity
Experiments
Rheology
Ship Automation
The Application of Micro-computer in Ships
Random Process and Statistics
Numerical Analysis
Fortran Language
Information Index

I. National Taiwan College of Marine Science and Technology
2 Pei Ning Road
Keelung, Taiwan
China

II. Graduate Institute of Harbour and Ocean Engineering (GIHOE)
A. Degrees Offered
1. Department of Oceanography, Section of Ocean Engineering: Bachelor of Science
2. Departments of Navigation Marine Engineering, Naval Architecture, and River and Harbour Enginnering: Bachelor's Degree
3. GIHOE: Master's Degree
B. Professor Norman C. H. Wei

III. Harbour and Ocean Engineering
A. Unknown
B. Emphasis on harbour and shoreline construction, construction in coastal and offshore regions, and deep-sea construction
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credits)
A. Required
Wave Theory (4)
Seminar of River and Harbour Engineering (4)
B. Electives
Harbour Planning (2)
Harbour Design (2)
Advanced Coastal Hydraulics (3)
Advanced Applied Mathematics (3)
Coastal Environmental Engineering (2)
Estuary Environmental Engineering (2)
Engineering Geology Research (2)
Vibration Theory (2)
Soil Dynamics (2)
Reinforced Concrete Research (2)
Coastal and Harbour Survey (2)
Application of Finite Element Method (2)
Ocean Development (2)
Advanced Materials for Ocean Engineering (2)
Turbulence Theory (2)
Coastal Structure Design (2)
Marine Civil Engineering (3)
Structural Dynamics (2)
Model Test (2)
Ocean Hydrodynamics (3)
Marine Resources Prospecting (2)
Ocean Salvage and Surveillance (2)
Marine Pollution Control (2)
Spectral Analysis (2)
Ocean Acoustics (2)
Stability and Maneuverability of Ship (2)
Tides (2)
Perturbation Method (2)

I. Shandong College of Oceanography
(Shandong Ocean College)
P.O. Box 90
5 Yushan Road
Qingdao Shandong
China

II. Dynamic Oceanography Laboratory .
A. Master's Degree
B. Professor Hou Guohen

III. Ocean Engineering
A. Higher Mathematics, Mathematics, Methods of Physics, Probability, Mathematical Statistics, Physics, Theoretical Mechanics, Fluid Mechanics, Foreign Languages
B. Degree Requirements: unknown
C. Options or Information
Dynamics of Marine Structures

IV. Postgraduate Courses of Subjects (credits)
Mathematics (10)
Applied Probability (6)
Mathematical Statistics
Stochastic Processes
Ordinary Differential Equations (2)
Partial Differential Equations (2)
Dynamics of Marine Structures (Offshore) (4)
Computer Applications and Computational Methods (6)
Wave Theory-Wind Wave and Swells (4)
Dynamics of Coastal Engineering Structures (4)
Hydrodynamics (4)
Experimentation Technology (6)
Air-sea Interactions
Wind Wave Spectra
Wave reflexion and Deflexion
Sand Deposition and Erosion by the Wave Current
Waterway and Harbor Model Experiment
Offshore Model Experiment

I. Shanghai Jiao Tong University
1954 Hua San Road
Shanghai 200030
China

II. Department of Naval Architecture
A. Degrees Offered
1. Master of Science in Engineering
2. Doctor of Science in Engineering
B. Names of Program Heads or Directors
1. Ship Design: Professor Yang Yu
2. Ship Hydrodynamics: Professor Chen-Pang Sheng
3. Ship Structural Mechanics: Professor Tieh-Yun Chen

III. Naval Architecture and Ocean Engineering
A. Bachelor's degree is a prerequisite to enter Master's program; Master's degree is generally a prerequisite to enter doctoral program; competitive examination for entrance
B. Degree Requirements
1. Master's Degree: 3-4 courses in advanced mathematics, advanced courses in applied mechanics, ship structural mechanics, ship hydrodynamics or ship design; thesis
2. Doctoral Degree: advanced study in mathematics and applied mechanics; special topics in structural mechanics, hydrodynamics or ship design; second foreign language; dissertation
C. Options or Information: none

IV. Postgraduate Courses or Subjects
Unknown

I. South China Institute of Technology
Guangzhou (Canton)
China

IIa. Department of Naval Architecture
A. Master of Technology
B. Professor Luo Ming-lü

IIb. Department of Naval Architecture
A. Master of Technology, Power Engineering
B. Professor Lu Fu

IIIa. Seakeeping Qualities of Ships
A. Bachelor's Degree in Naval Architecture; entrance examination
B. Dialectics of Nature; foreign languages; 6 courses in mathematics; 4 core courses, educational practice, industrial training

IIIb. Marine Engines (Internal Combustion)
A. Bachelor's Degree in Mechanical Engineering or Marine Engineering; entrance examination
B. Dialectics of Nature; foreign languages; 8 core courses, 5 electives, educational practice, industrial training, project work

IV. Postgraduate Courses or Subjects (credits)
A. Master of Technology
Required:
Dialectics of Nature (3)
Foreign Language: English
Partial Differential Equations (2)
Functions of a Complex Variable and Integral Transformation (3)
Linear Algebra (2)
Probability and Statistics (3)
Real Variable Functions and Functional Analysis (3)
Integral Equations and Variational Calculus (2)
Ship Motions in Waves (3)
Wave-making Theory and Its Applications (3)
Theory of Marine Screws (3)
Electives:
Foreign Language: Japanese (4)
Design Methods with Computer-aid (3)
Finite Element Method and Its Applications to Hydrodynamics (3)
B. Master of Technology, Power Engineering
Required:
Dialectics of Nature (3)
Foreign Language I (6)
Engineering Mathematics (10)
Hydrodynamics and Aerodynamics (3)
Thermodynamics II (3)
Heat Transfer II (2)
Principle of Wankel Engines (4)

Experiment and Measurement of Internal Combustion Engines (1.5)
Combustion Theory for Internal Combustion Engines (2)
Electives:
Foreign Language II
Heat Transfer and Thermal Loading of Internal Combustion Engines
Internal Combustion Engine Cycle Simulation
Energy Sources and Economization

I. Tianjin University
Tianjin City
China

IIa. Department of Ocean Engineering and Naval Architecture
A. Master of Offshore Engineering
B. Associate Professor Xu Jizu

IIb. Department of Hydraulic Engineering
A. Master of Coastal Engineering
B. Professor Liu Xuanlie

IIIa. Offshore Engineering
b. Coastal Engineering
A. Bachelor's degree in Ocean Engineering, Hydraulic Engineering, Civil Engineering or equivalent; entrance examination
B. 3 basic courses, 4 core courses, some elective courses: 30 total credits;research thesis; oral examination
C. Options or Information: unknown

IVa. Postgraduate Courses or Subjects (credits)
A. Required
Basic Courses:
Natural Dialectics (3)
Advanced Mathematics (6)
First Foreign Language (6)
Core Courses:
Theory of Elasticity (3)
Theory of Plasticity (3)
Basic Structural Dynamics (4)
Vibration Problem in Marine Structure (4)
B. Elective Courses
Numerical Analysis (3)
Matrix Methods and Computer Program for Structural Analysis (2)
Equations of Mathematical Physics (3)
Second Foreign Language (3)

IVb. Coastal Engineering
A. Required
Basic Courses:
Natural Dialectics (3)
Advanced Mathematics (6)
First Foreign Language (6)
Core Courses:
Advanced Fluid Mechanics (4)
Coastal Engineering (4)
Wave Theories and their Application (3)
Hydraulic Modelling (3)
B. Elective Courses
Ocean and Estuary Hydrodynamics (3)
Coastal Geomorphology (2)
Sedimentation Engineering (3)
Second Foreign Language (3)

I. Tongji University
Shanghai
China

II. Department of Civil Structure Engineering
A. Degrees Offered
1. Bachelor of Engineering Science in Ocean Engineering
2. Master of Engineering Science in Ocean Engineering
B. Professor Hu Rui-Hua

III. Ocean Engineering
A. Bachelor of Engineering Science Degree in engineering; entrance examination
B. Courses;thesis
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credits)
Foreign Language (3)
Natural Dialectics (3)
Advanced Applied Mathematics (6)
Ocean Hydrology (3)
Fluid Mechanics and Wave Theory (5)
Finite Elements Analysis (3)
Dynamics of Structures (3)
Marine Geotechnology and Foundation Engineering (3)
Behaviour and Design of Steel Structures (3)
Behaviour and Design of Reinforced Concrete Structures (3)
Analysis and Design of Offshore Structures (4)
Analysis and Design of Ocean Engineering (4)
Structural Models and Testing (2)

I. Danmarks Tekniske Højskole
(Technical University of Denmark)
Institute for Ship and Ocean Engineering
DK-2800 Lyngby
Denmark

II. Department of Ocean Engineering
A. Degrees Offered
1. Master of Science in Ocean Engineering
2. Doctor of Philosophy in Ocean Engineering
B. Professor Sv. Aa. Harvald

III. Ocean Engineering
A. General Certificate; basic courses in mathematics and mechanics
B. At least 9 courses in department
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
7661 Fundamental Ocean Engineering
7663 Ocean Engineering
7666 Ship Graphics
7667 Naval Architecture
7668 Ship and Ocean Engineering Design
7671 Ship Hydromechanics I
7672 Ship Hydromechanics II
7677 Strength of Ships and Offshore Structures
7678 Scantlings of Floating Structures
7681 Strength and Vibrations, Numerical Methods
7683 Plate and Shell Structures
7685 Ship Machines
7687 Marine Engineering I
7688 Marine Engineering II
7692 Special Subject in Ocean Engineering

I. Rheinisch-Westfälischen Technischen Hochschule Aachen
(Technical University Aachen)
Templergraben 55
D-5100 Aachen
Federal Republic of Germany

IIa. Ocean Engineering Division
A. Degrees Offered
1. Diplom-Ingenieur
2. Doktor-Ingenieur
B. Professor Dr.-Ing. K. Kokkinowrachos

IIb. Professional Chair of Naval Architecture, Construction and Statics
A. Diplom-Ingenieur (Mechanical Engineering/Naval Architecture)
B. Professor Dr.-Ing. H. G. Schultz

IIIa. Ocean Engineering
A. Intermediate examination ("Vorexamen") after at least two years studies
B. Degree Requirements
1. Diplom-Ingenieur Intermediate examination
2. Doktor-Ingenieur "Diplom-Hauptprufung" (Diplom-Ingenieur) after at least five years of studies
C. Options or Information: none

IIIb. Naval Architecture and Ocean Engineering
A. Vordiplomprufung (Bachelor of Science) in Naval Architecture
B. Unknown
C. Options or Information: none

IVa. Postgraduate Courses or Subjects
A. Fundamentals of Ocean Engineering (two years)
Principles of Physical Oceanography
Oceanographical Engineering
Environmental Conditions
Environmental Loads and Load Effects
Design of Marine Structures
Energy
Diving Physiology and Techniques
B. Ocean Engineering Systems (one year)

IVb. Postgraduate Courses or Subjects
Stability of Ships and Offshore Structures

I. Technische Universität Berlin
(Technical University Berlin)
Strasse des 17. Juni 135
1000 Berlin 12
Federal Republic of Germany

II. Interdisciplinary Project Group in Ocean Engineering - AKMT
1. Institut fur Schiffs-und Meerestechnik
2. Institut fur Bergbauwissenschaften
3. Institut fur Wasserbau und Wasserwirtschaft
   A. Diplom-Ingenieur
   B. 1. Professor Dr.-Ing. G. Clauss
      2. Professor Dr.-Ing. H. Wolff
      3. Professor Dr.-Ing. H. Kaldenhoff

III. Name of Programs
1. Naval Architecture
2. Mining Engineering
3. Civil Engineering
   A. Vordiplom-Examination
   B. Vordiplom (8 general courses), plus Hauptdiplom (8 special courses), plus diplom-thesis; additional thesis in field of choice; minimum of 8 terms
   C. Options or Information: Ocean Engineering
   The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IV. Postgraduate Courses or Subjects (Hauptdiplom)
A. Ocean Engineering
   1. Principles of Ocean Engineering
   2. Offshore Technology
   3. Stability of Offshore Structures
   4. Marine Mining
   5. Deep Drilling Technology
   6. Coastal Engineering
B. Design of Ships
C. Stability of Ships
D. Hydromechanics
E. Propulsion
F. Transport Technology
G. Marine Engineering
H. CAD
I. Business Administration
(Sujects B to I consist of more than one course each)

I. Technische Universität Clausthal
(Technical University Clausthal)
Agricolastrasse 10
3392 Clausthal-Zellerfeld
Federal Republic of Germany

II. Project Group Ocean Engineering and Marine Minerals (AMIUC)
A. Diplom-Ingenieur (Mining)
B. Professor Dr.-Ing. C. Marx

III. Project Group Ocean Engineering and Marine Minerals
A. Vordiplomprüfung in Mining (equivalent to Master of Science)
B. Unknown
C. Options or Information:
1. Ocean Engineering
2. Marine Technology
3. Marine Mining

IV. Postgraduate Courses or Subjects
Offshore Technology
Marine Geology
Marine Research Technology
Scientific Diving
Measuring and Transmitting Marine Data
Positioning and Navigation

I. Universität Hamburg
(University of Hamburg)
Lämmersieth 90
2000 Hamburg 60
Federal Republic of Germany

II. Institut für Schiffbau
A. Degrees Offered
1. Diplom-Ingenieur
2. Doktor Ingenieur
B. Professor Dr.-Ing. Hansjörg Petershagen

III. Naval Architecture
A. Vordiplomprufung
B. Unknown
C. Options or Informatio:
1. Naval Architecture with emphasis on engineering fundamentals for a career in practice and industry
2. Naval Architecture with emphasis on development and research
3. The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT)

IV. Postgraduate Courses or Subjects (including research fields)
Applied Mathematics and Mechanics
Fluid Mechanics
Ship Theory
Ship Design
Ship Propulsion and Cavitation
Strength of Materials and Materials Science
Ship Structures and Construction
Marine Engineering
Ship Electrical Engineering
System Engineering and Statistical Methods in Naval Architecture
Ocean Engineering

I. Universität Hannover
(University of Hannover)
Callinstrasse 15
3000 Hannover
Federal Republic of Germany

II. Institute for the Design of Ships and Ship Theory
A. Diplom-Ingenieur (Mechanical Engineering/Naval Architecture)
B. Professor Dr.-Ing. H. Poehls

III. Ocean Engineering
A. Diplomvorprufung (Bachelor of Science) in Naval Architecture
B. Unknown
C. Options or Information: none

IV. Postgraduate Courses or Subjects
Designing of Supply Vessels and Offshore Structures

I. Ecole Centrale des Arts et Manufactures
(Central School of Arts and Manufacturing)
Grande Voie des Vignes
92290 Chatenay-Malabry
France

IIa. Unknown
A. Engineering degree, Doctorate
B. Mr. G. Mondain-Monval

IIb. Laboratory of Soil Mechanics-Structures
A. Degrees Offered
1. D.E.A. (similar to Master of Science)
2. D.D.I. (similar to Doctor of Philosophy)
B. Professor Jean Biarez

IIIa. Ocean Engineering
A. Bachelor of Science in Engineering
B. Unknown
C. Options or Information: unknown

IIIb. Marine Soil Mechanics
A. D.E.A. in Soil Mechanics
B. Lectures; research; collaboration with industry specialists; thesis
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (class hours)
A. Ocean Engineering
1. Fluid Mechanics
Advanced Fluid Mechanics (25)
Hydrodynamics (33)
Numerical Methods (23)
Thermodynamics (20)
2. Environmental
Waves (18)
Meteorology/Ocean Environment (21)
Acoustics (27)
Marine Corrosion (30)
Marine Geology (17)
3. Ocean Resources (45)
4. Engineering Structures
Mathematical Methods (69)
Offshore Structures (27)
Applied Mechanics (22)
Systems (21)
B. Marine Soil Mechanics
None specified

I. Ecole Nationale des Ponts et Chaussées
(National School of Bridges and Highways)
28 Rue des Saints Peres
75007 Paris
France

II. Unknown
A. Unknown
B. Unknown
C. Unknown

III. Coastal and Harbour Engineering *
A. Unknown
B. Unknown
C. Options or information: unknown

IV. Postgraduate Courses or Subjects
Unknown

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* Understood to have relevant program, but details unknown.

I. Ecole Nationale Supérieure de Techniques Avancées
(National School of Advanced Technology)
32 Boulevard Victor
75015 Paris
France

II. Unknown
A. Unknown
B. Unknown

III. Offshore Engineering, Naval Architecture, Marine Engineering
A. Unknown
B. Unknown
C. Options or Information
The school is a participant in the West European Graduate Education in Marine Technology (WEGEMT)

IV. Postgraduate Courses or Subjects
Unknown

I. Universite de Nantes
(University of Nantes)
1, rue de la Noë
44072 Nantes Cedex
France

II. Ecole Nationale Supérieure de Mécanique
A. Degrees Offered
1. Diploma in Engineering ENSM; Diploma in Profound Studies
2. Doctor of Philosophy in Sciences
3. Diploma in the Discipline of Advanced Hydrodynamics
B. Rector Y. Pironneau

III. Naval Architecture
A. Prerequisites to Enter Program
National Entrance Exams ENSI, Courses in Higher Mathematics (Mathematics and Physics)

B. Degree Requirements
Engineering Diploma ENSM, National Entrance Exams ENSI, admission according to qualifications - foreign diplomas, level baccalauréat plus 2 years or baccalauréat plus 3 years
1. Diploma in Engineering in section advanced hydrodynamics: Engineering diplomas French and Foreign
2. Diplomas of Profound Studies and Doctorats: Engineering diplomas, Masters of Science, BSC - BSCA
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (total hours: lectures, tutorials, practicals)
A. Engineering diploma ENSM
N 301 Introduction to the Hydrodynamics of Perfect Fluids (18, 15, 0)
N 302 Theory of Gravity Waves (18, 22.5, 0)
N 303 Theory of Planar Flow (15, 12, 0)
N 304 Bed Limits
N 305 Blades and Helixes, Propulsion Theory (30, 21, 0)
N 306 Naval Mechanics, Strength of Materials (6, 10.5, 0)
N 307 Naval Mechanics, Practical Work (0, 0, 36)
N 308 Numerical Analysis, Structures (12, 16, 0)
N 309 Further Applied Numerical Analysis (16, 18, 0)
N 310 Corrosion (6, 0, 12)
N 311 Marine Diesels (12, 0, 0)
N 312 Turbulence (12, 0, 0)
N 313 Two-phase Flow (12, 0, 0)
N 314 Hydraulic Machines (9, 6, 0)
N 315 Vessel Motions (15, 10.5, 0)
N 316 Further Vessel Stability (6, 0, 0)
N 317 Hull Calculation and Drawings (7, 6, 0)
N 318 Project - Vessels (0, 0, 90)
N 319 Project - Hydrodynamics (0, 0, 20)
N 320 Offshore (14, 0, 0)
N 321 Mathematical Optimization (15, 6, 0)

B. Engineering Diploma Specializing in Advanced Naval Hydrodynamics
   SS 101 Mathematics (15, 0, 0)
   SS 102 Programming (15, 0, 0)
   SS 103 Fundamental Naval Hydrodynamics (15, 60, 0)
   SS 104 Control and Stability of Marine Engines (10, 20, 0)
   SS 105 Floating Body Dynamics (30, 30, 0)
   SS 106 Propulsion and Cavitation (15, 15, 0)
   SS 107 Perfect Fluid Kinematics (30, 37.5, 0)
   SS 108 Irregular Waves (18, 0, 0)
   SS 109 Turbulence (6, 0, 0)
   SS 110 Variational Methods (20, 0, 0)

C. Diploma of Profound Studies in Mechanical Engineering
   1. Options: Hydroelasticity
      Structural Mechanics
      Metals and Alloys
      Oceanography
      Thermodynamics
      Biphase Low
   2. Courses
      a. Required (95 hours)
         Experimental Methods and Data Acquisition
         Thermodynamics and Continuum Mechanics
      b. Optional (choice of 2 subjects)
         Plasticity
         Thermodynamics of Solids
         Introduction to Thermal Transfer
         The Ocean: Atmospheric Interaction
         Mathematical Optimisation
         Variational Methods
         Numerical Methods
      c. Courses for each option (55 hours)
         The studied courses chosen from the list below, are fixed by the student's research director.
         Fundamental Hydrodynamics
         Turbulence
         Cavitation
         Hydroelasticity
         Complex and Further Heat Transfer
         Application and Thermal Systems
         Thermodynamical Analysis and Energy Optimisation
         Non-linear Mechanics
         Structural Mechanics
         Structural Elastodynamics
         Hydro- and Aeroelasticity
         Quality Control
         Production Optimisation
         Further Elasticity

I. Indian Institute of Technology, Bombay
Powai, Bombay 400 076
India

II. Department of Civil Engineering
A. Degrees Offered
1. Master of Technology
2. Doctor of Philosophy
B. Professor Dr. S. Narasimha

III. Offshore Engineering
A. Prerequisite to Enter Program
1. Master of Technology: Bachelor's Degree in Civil, Mechanical or Aeronautical Engineering
2. Doctor of Philosophy: Master of Technology
B. Degree Requirements
Master of Technology: 3 semesters of course work and 1 semester research thesis, total credits 110
C. Options or Information
Research areas:
1. Wave Hydrodynamics
2. Offshore Structures
3. Marine Geotechnical Engineering

IV. Postgraduate Courses or Subjects (Credits)
CE 669 Fluid Loading on Offshore Structures (3)
CE 633 Marine Geotechnical Engineering (3)
CE 671 Advanced Structural Mechanics (3)
CE 702 Analysis of Offshore Structures (Deterministic) (2)
CE 707 Probability Methods in Offshore Structures (3)
CE 677 Offshore Construction (3)
CE 668 Mechanics of Water Waves (3)
CE 703 Foundations of Offshore Structures (2)
CE 628 Design of Offshore Structures - Concrete and Steel (2)
CE 673 Floating Structures and Submarine Pipeline (2)
MA 526 Theory of Stochastic Processes (3)
MtE 640 Fracture Mechanics, Fatigue and Corrosion in Offshore Structures
CE 676 Computer Aided Design of Offshore Structures (2)
CE 688 Geology of Petroleum Basins and Structures of Offshore Regions

I. Indian Institute of Technology, Delhi
New Delhi 110 016
India

IIa. Department of Civil Engineering
A. Degrees Offered
1. Master of Technology
2. Doctor of Philosophy
B. Dean S. K. Gulhati

IIb. Center for Applied Research in Electronics
A. Degrees Offered
1. Master of Technology in Underwater Electronics
2. Doctor of Philosophy
B. Name of Program Head or Director: unknown

IIIa. Offshore Engineering
A. Bachelor of Technology, First Division
B. Degree Requirements
1. Master of Technology: 54 credits of courses and research; 15 credits in major area of specialization, 6 for laboratory work, 9 credits outside the field of specialization within the department, and 15 credits of project work
2. Doctor of Philosophy: Master's Degree or equivalent
C. Options or Information
Offshore Engineering is an option for a civil engineering degree

IIIb. Underwater Electronics
A. Master of Technology; 3 semesters of course work and 1 semester research thesis
B. Master of Technology: 3 semesters of course work and 1 semester research thesis
C. Options or Information
Sonar Systems, Sonar Signal Processing, Underwater Communications/Underwater Imaging

IV. Postgraduate Courses or Subjects (credits)
A. Offshore Engineering
CE 635 Offshore Structures (3)
CE 696 Dynamics of Soil-Structure Interaction (3)
CE 707 Geotechnical Aspects of Ocean Engineering (3)
CE 744 Coastline Hydrodynamics (3)
CE 793 Dynamics of Fixed Offshore Structures (3)
B. Underwater Electronics
Signal Theory
Principles of Communications
Applied Mathematics
Digital Signal Processing
Digital Hardware Design
Underwater Acoustics

Sonar System Engineering
Radar Technology
Microprocessors and Their Applications
Sonar Signal Processing
Acoustic Arrays and Transducers
Miscellaneous Underwater Systems

I. Indian Institute of Technology, Kharagpur
Kharagpur 721 302
West Bengal
India

II. Department of Naval Architecture
A. Master of Technology in Marine Technology
B. Professor R. P. Gokarn

III. Marine Technology
A. Bachelor's Degree in Aeronautical, Civil, or Mechanical Engineering, or Naval Architecture
B. Degree Requirements: 12 courses including laboratory work; industrial training (10 weeks); project; dissertation
C. Options or Information: A number of electives are offered

IV. Postgraduate Courses or Subjects
A. Compulsory
Engineering Mathematics
Ship Hydromechanics
Wave Mechanics
Marine Systems
Marine Construction Techniques
Marine Structures
Computer Applications
Instrumentation and Automatic Control
Marine Transportation
B. Electives
Ocean Engineering Structures and Vehicles
Ship Construction Management
Performance of Ships at Sea
Welding and Bonding
Marine Machinery
Random Vibration
Advanced Ship Design
Marine Materials

I. Indian Institute of Technology, Madras
Madras 600 036
India

II. Ocean Engineering Center
A. Degrees Offered
1. Master of Technology
2. Master of Science
3. Doctor of Philosophy
B. Professor Dr.-Ing. V. S. Raju

III. Ocean Engineering
A. Prerequisites to Enter Program
1. Master of Technology: Bachelor's Degree in Aeronautical Engineering, Civil Engineering, Mechanical Engineering, or Naval Architecture
2. Master of Science: Bachelor's Degree in Engineering or equivalent, first class or 60% of marks
3. Doctor of Philosophy: Master of Technology or Master of Science in Engineering with first class
B. Degree Requirements
1. Master of Technology: 2 courses in mathematics; 6 core courses; 8 electives, including a minimum of 6 from the oriented project courses; seminar; industrial training; and project work
2. Master of Science: 5 or 6 courses as prescribed by the General Test Committee and research thesis of about a 3 semester duration on a specific topic
3. Doctor of Philosophy: 4 advanced level courses and research thesis for about 3 years on a full time basis
C. Options or Information: Research areas
1. Floating and Submerged Bodies - stability, launching and installation
2. Marine Geotechnical Engineering
3. Ocean Hydrodynamics
4. Materials in Ocean Environment
5. Structural Analysis and Design
6. Ocean Energy

IV. Postgraduate Courses or Subjects (credits)
A. Required
OE 601 Oceanography (Physical and Geological) (3)
OE 602 Marine Geotechnical Engineering (3)
OE 603 Hydrodynamics (3)
OE 604 Sea Surveying (3)
OE 605 Ocean Structures and Materials (3)
OE 607 Structural Analysis (3)
B. Elective
OE 652 Wave Dynamics
OE 654 Dynamics of Ocean Structures and Floating Bodies (3)
OE 656 Marine Foundation (3)

OE 658 Plated Structures and Shells (3)
OE 662 Finite Element Methods as Applied to Ocean Engineering (3)
OE 711 Design of Onshore Facilities (3)
OE 713 Marine Transport (3)
OE 715 Port and Harbour Structures (3)
OE 717 Ocean Pollution and Control (3)
OE 719 Coastal and Deep Ocean Dredging (3)
OE 721 Navigation and Position of Offshore Structures (3)
OE 723 Offshore Construction Techniques (3)
CE 720 Estuarine Dynamics
CE 764 Shore Erosion and Processes
CE 724 Design of Offshore Structures (3)

I. Karnataka Regional Engineering College
(Mysore/Mangalore University)
Surathkal
P.O. Srinivasanagar 574 157
Karnataka
India

II. Department of Applied Mechanics
A. Master of Technology
B. Professor Dr. I. V. Nayak

III. Marine Structures
A. Bachelor's Degree in Civil Engineering
B. Theoretical and laboratory studies at the college and practical training in the field; project; laboratory; research; organization spread over two years
C. Options or Information: unknown

IV. Postgraduate Course or Subjects
Advanced Mathematics
Theory of Elasticity
Soil Mechanics
Advanced Fluid Mechanics and Open Channel Flow
Structural Analysis and Design of Steel and Timber Structures
Materials Technology and Concrete Structures
Wave Hydrodynamics and Wind Waves
Coastal Engineering
Harbour Planning, Operation and Management
Harbour Structures and Foundations
Experimental Stress Analysis and Instrumentation

I. University College Cork
Cork
Ireland

II. Department of Civil Engineering
A. Master of Engineering Science and Doctor of Philosophy
B. Professor E. C. Dillon

III. Coastal and Offshore Engineering
A. Honours Hydraulic Engineering and Structural Engineering courses; Bachelor of Engineering, Bachelor of Science or equivalent
B. Examinations in 4 units; thesis
C. Options or Information
1. Finite Element Method in Structural and Continuum Mechanics
2. Foundation Engineering
3. Rheology, Plasticity and Fracture Mechanics
4. Advanced Numerical Methods

IV. Postgraduate Courses or Subjects
Unknown

I. Ehime University
Faculty of Engineering
Bunkyo-cho 3, Matsuyama
Ehime 790
Japan

II. Department of Ocean Engineering
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
B. Professor Dr.-Eng. T. Muro

III. Ocean Engineering
A. Bachelor's Degree
B. 30 credits: thesis
C. Options or Information: Chairs in the following subjects:
Coastal Oceanography
Marine Meteorology
Ocean Construction Engineering
Ocean Exploitation Engineering
Marine Resources Engineering

IV. Postgraduate Courses or Subjects (credits)
A. Required Courses
Advanced Seminar in Ocean Engineering (4)
Advanced Experiment in Ocean Engineering (10)
B. Elective Courses
Advanced Coastal Oceanography (4)
Physical Oceanography (2)
Advanced Marine Meteorology (4)
Advanced Ocean Information Theory (2)
Dynamics of Ocean Structures (2)
Advanced Ocean Hydraulics (2)
Advanced Ocean Exploitation Engineering (4)
Regional Planning (2)
Advanced Marine Resources Engineering (4)
Advanced Marine Resources (2)
Applied Mathematics I (2)
Applied Mathematics II (2)
Mathematical Analysis I (2)
Mathematical Analysis II (2)
Applied Physics (2)

I. Hiroshima University
Saijo
Higashihiroshima 724
Japan

IIa. Design Engineering Course
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Engineering
B. Professor H. Yonewawa

IIb. Structural Engineering Course
A. See IIa. A., above
B. Professor H. Omura

IIIa. Design Engineering Course
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree
2. Doctor's Program: Master's Degree
B. Specified laboratories; thesis; two years for Master's Degree; three additional years minimum for Doctor's Degree
C. Options or Information: Laboratories listed below
Ship Resistance and Propulsion
Ship Motion and Maneuverability
Ship Design and Equipments
Marine Structure Design

IIIb. Structural Engineering Course
A. See IIIa. A., above
B. See IIIa. B., above
C. Options or Information: Laboratories listed below
Strength of Ship Structure
Strength of Welding
Marine Structure Engineering

IV. Postgraduate Courses or Subjects
A. Design Engineering Course
D 401 Advanced Theory of Strength of Materials (2)
D 402 Advanced Theory of Hydrodynamics (2)
D 403 Advanced Course of Automatic Control (2)
D 404 Advanced Course of Mechanical Vibration (2)
D 405 Advanced Course of Machine Design (2)
D 406 Advanced Theory of Ship Motions (2)
D 407 Advanced Course of Ship Design (2)
D 408 Design Engineering Seminar I (2) +
D 409 Design Engineering Seminar II (2) +
D 410 Design Engineering Colloquium I (2) ++
D 411 Design Engineering Colloquium II (2) ++
D 412 Design Engineering Colloquium III (2) ++
D 421 Advanced Course of Machine Dynamics (2)
D 422 Advanced Course of Metal Fatigue (2)

D 423 Advanced Course of Measurements in Mechanical Engineering (2)
D 424 Advanced Theory of Maneuverability (2)
D 425 Advanced Course of Optical Appratuses Design (2)
D 426 Advanced Course of Precision Machinery (2)
D 427 Advanced Course of Machine Tools (2)
D 428 Advanced Course of Metal Casting (2)
D 429 Advanced Course of Powder Metallurgy Processing (2)
D 430 Advanced Course of Ship Equipments (2)
D 431 Advanced Course of Ship Resistance and Propulsion (2)
D 432 Advanced Course of System Design (2)
D 451 Special Topics I (2)
D 452 Special Topics II (2)
D 453 Special Topics III (2)
D 454 Special Topics IV (2)

B. Structural Engineering Course

D 601 Advanced Structural Mechanics I (2)
D 602 Advanced Structural Mechanics II (2)
D 603 Advanced Course of Structural Engineering (2)
D 604 Advanced Theory of Vibration (2)
D 605 Structural Engineering Seminar I (2) *
D 606 Structural Engineering Seminar II (2)*
D 607 Structural Engineering Colloquium I (2) **
D 608 Structural Engineering Colloquium II (2)**
D 609 Structural Engineering Colloquium III (2)**
D 621 Advanced Course of Concrete Engineering (2)
D 622 Advanced Theory of Structure in Civil Engineering (2)
D 623 Advanced Course in Soil Mechanics (2)
D 624 Advanced Course in Foundation Engineering (2)
D 625 Advanced Strength of Ship Structure (2)
D 626 Advanced Mechanics of Welding (2)
D 627 Advanced Metallurgy of Welding (2)
D 628 Advanced Theory of Building Structures (2)
D 629 Advanced Theory of Earthquake Resistant Structures (2)
D 630 Advanced Course of Disaster Prevention Engineering (2)
D 651 Special Topics I (2)
D 652 Special Topics II (2)
D 653 Special Topics III (2)
D 654 Special Topics IV (2)
D 655 Special Topics V (2)
D 656 Special Topics VI (2)
D 657 Special Topics VII (2)
D 658 Special Topics VIII (2)

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* Required
** Required for doctoral

I. Kagoshima University
Faculty of Engineering
Koorimoto 1-21-40
Kagoshima City
Japan

II. Department of Ocean Civil Engineering
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
B. Professor Dr.-Eng. M. Haruyama

III. Ocean Civil Engineering
A. Bachelor's Degree or equivalent
B. 30 credits; thesis
C. Options of Information: unknown

IV. Postgraduate Courses or Subjects (credits)
Physical Oceanography I (2)
Physical Oceanography II (2)
Measurements in the Ocean (2)
Mechanics of Water Waves (2)
Ocean Development and Planning (2)
Coastal Engineering I (2)
Coastal Engineering II (2)
Exercise in Miscellaneous Craft for Ocean Engineers (4) (required)
Experiments in Ocean Engineering (4) (required)
Applied Mathematics (4)
Structural Engineering I (2)
Structural Engineering II (2)
Materials in Civil Engineering (2)
Concrete Structures I (2)
Concrete Structures II (2)
Soil Mechanics (2)
Foundation Engineering (2)
Applied Physics (4)
Ocean Structural Engineering (2)

I. Kyushu University
Hakozaki, Higashi-ku
Fukuoka 812
Japan

II. Department of Naval Architecture
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Engineering
B. Changes every two years
C. Options or Information: unknown

III. Naval Architecture
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree
2. Doctor's Program: Master's Degree
B. Degree Requirements
1. Master of Engineering: 30 credits (more than 18 credits from courses listed below plus remainder from other disciplines); thesis
2. Doctor of Engineering: 20 credits from courses listed below, not including thesis research; thesis, over a minimum of three years
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
A. Master's Program
Advanced Course of Strength of Ships
Advanced Course of Vibration of Ships
Advanced Course of Dynamics of Ships
Advanced Hydrodynamics I
Advanced Hydrodynamics II
Advanced Theory for Ship Design I
Advanced Theory for Ship Design II
Advanced Course of Resistance of Ships
Advanced Course of Propulsion of Ships
Ship Hydrodynamics
Applied Mechanics for Naval Architects
Advanced Theory of Plasticity
Welding Mechanics
Fracture Mechanics
Hydrodynamics of Marine Structures I
Hydrodynamics of Marine Structures II
B. Doctor's Program
Strength and Vibration of Ships (Seminar)
Hydrodynamics and Dynamics of Ships (Seminar)
Structure of Ships, Design of Merchant Ships (Seminar)
Resistance and Propulsion of Ships (Seminar)
Technical Theory of Shipbuilding (Seminar)
Welding Engineering for Naval Architecture (Seminar)
Hydrodynamics of Marine Structures (Seminar)

I. Nihon University
1-8 Kanda-Surugadai, Chiyoda-ku
Tokyo 101
Japan

II. Department of Marine Architecture and Engineering
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Philosophy
B. Professor M. Sakuta

III. Marine Architecture and Engineering
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree, usually in engineering, mathematics, or physics
2. Doctor's Program: Master of Engineering Degree
B. Degree Requirements
1. Master of Engineering: 30 credit hours; thesis
2. Doctor of Engineering: 10 credit hours; dissertation
C. Options or Information
Graduate curriculum divided into three areas
1. Ocean Environments
2. Ocean Structures
3. Basic Oceanography

IV. Postgraduate Courses or Subjects (credit hours)
A. Ocean Enironments
Coastal Environment Planning I (2)
Coastal Environment Planning II (2)
Ocean Environment Engineering I (2)
Ocean Environment Engineering II (2)
Ocean Facility Planning (2)
B. Ocean Structures
Ocean Steel Structure Engineering (2)
Ocean Concrete Structure Engineering (2)
Floating Structure Studies I (2)
Ocean Structure Studies I (2)
Ocean Structure Studies II (2)
Ocean Structure Studies III (2)
Ocean Structural Material Engineering (2)
Oceean Construction Project Studies (2)
Seabed Engineering (2)
Earthquake-Resistance for Marine Engineering (2)
C. Basic Oceanography
Aquacultural Engineering (2)
Basic Oceanography (2)
Water Wave Mechanics (2)
Oceanographic Observation
History of Ocean Construction Technology (2)

I. Osaka University
Faculty of Engineering
Yamada-Ue
Suita City
Japan

II. Department of Naval Architecture
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Engineering
B. Changes yearly

III. Naval Architecture
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree or equivalent
2. Doctor's Program: Master's Degree or equivalent
B. Degree Requirements
1. Master's: 30 credits from required courses listed below; thesis, over a minimum of two years full time
2. Doctor's: thesis, over a minimum of three years full time
C. Options or information: none

IV. Postgraduate Courses or Subjects (credit hours)
Ship Design (4)
Elastic-plastic Analysis of Structures (4)
Strength of Ships (4)
Vibration of Ships (4)
Hydrodynamics (4)
Resistance and Propulsion of Ships (4)
Theory of Waves (4)
Theory of Ship Motions I (4)
Theory of Ship Motions II (4)
Shipbuilding Practice (4)
Structural Design of Ships (2)
Exercises on Strength of Ships (4)
Exercises on Ship Hydrodynamics (4)
Exercises in Ship Design (4)
Applied Mathematics I (2)
Applied Mathematics II (2)

I. Tokai University
Faculty of Marine Science and Technology
Graduate School of Marine Science and Technology
100, Orido
Shimizu City, Shizuoka Prefecture 424
Japan

II. Ocean Engineering Course
A. Degrees Offered
1. Master of Engineering
2. Doctor of Engineering
B. Professor K. Hishida

III. Ocean Engineering
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree or equivalent
2. Doctor's Program: Master's Degree or equivalent
B. Degree Requirements
1. Master of Engineering: 32 credits, including 12 credits of thesis research
2. Doctor of Engineering: 40 credits, not including thesis research; some courses for Master's Degree may be included, if approved
C. Options or Information: principal programs
1. Marine Electronics
2. Marine Civil Engineering
3. Naval Architecture

IV. Postgraduate Courses or Subjects (credit hours)
Advanced Ocean Development Engineering (4)
Advanced Marine Measurement Engineering (4)
Advanced Marine Electronics (4)
Advanced Marine Electronic Measurement (4)
Topics in Applied Oceanography (4)
Advanced Underwater Acoustic Engineering I (4)
Advanced Underwater Acoustic Engineering II (4)
Advanced Marine Radio Engineering (4)
Advanced Marine Material Engineering (4)
Advanced Physical Oceanography (4)
Advanced Remote Sensing Technology for Oceanography (4)
Advanced Structural Analysis (4)
Advanced Steel Structure Engineering (4)
Advanced Soil and Foundation Engineering (4)
Advanced Management of Engineering (4)
Advanced Coastal Engineering (4)
Advanced Hydraulics (4)
Advanced Ocean Structure (4)
Advanced Harbor Engineering (4)
Advanced Oil Production Engineering (4)
Advanced Naval Architecture (4)
Advanced Plasticity and Plastic Design (4)
Advanced Ship Fitting (4)
Advanced Ship Design (4)
Advanced Material Mechanics (4)
Advanced Hull Construction Engineering (4)
Advanced Electromagnetic Fluid (4)
Advanced Special Vessels (4)
Systems Analysis for Maritime Industries (4)

I. Tokyo University of Fisheries
5-7 Konan 4, Minato-Ku
Tokyo 108
Japan

II. Department of Marine Environmental Science and Technology
A. Degrees Offered
1. Bachelor of Fisheries
2. Master's Degree in Fisheries
B. Name of Program or Course Head
1. Laboratory of Environmental Instrumentation Engineering: Professor K. Matsuike
2. Laboratory of Environmental Hydraulic Engineering: Professor J. Katoh
3. Laboratory of Environmental Protection Engineering: Professor T. Yoshida

III. Marine Environmental Science and Technology
A. Bachelor's Degree or equivalent
B. Master's Degree in Fisheries: 30 credits, including 16 in specified subjects; thesis
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
Unknown

I. University of Osaka Prefecture
Faculty of Engineering
Mozuumecho 40-084
Sakai City
Japan

II. Department of Naval Architecture
A. Degree Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Engineering
B. Unknown

III. Naval Architecture
A. Prerequisites to Enter Program
1. Master of Engineering: Bachelor's Degree or equivalent
2. Doctor of Engineering: Master's Degree or equivalent
B. Degree Requirements
1. Master of Engineering: 30 credits (more than 17 credits from courses listed below; thesis, over a minimum of two years full time
2. Doctor of Engineering: 20 credits from required courses listed below, not including thesis research; over a minimum of three years full time
C. Options or Information: Courses
Ship Design, Theory of Ship Motions, Theory of Ship Structure, Special Ship Design

IV. Postgraduate Courses or Subjects (credit hours)
Master of Engineering
Special Experiments on Naval Architecture (1)
Exercises on Naval Architecture I (2)
Exercises on Naval Architecture II (2)
Advanced Ship Design I (2)
Advanced Ship Design II (2)
Advanced Theory of Ship Motions (2)
Advanced Theory of Resistance and Propulsion of Ships (2)
Advanced Theory of Ship Structure I (2)
Advanced Theory of Ship Structure II (2)
Special Ship Design (2)
Engineering Work on Ship Building (2)
Advanced Theory of Special Ship Design (2)
Advanced Theory of Ship Hydrodynamics (2)
Doctor of Engineering
Advanced Exercises on Naval Architecture I (4)
Advanced Exercises on Naval Architecture II (2)
Advanced Research of Naval Architecture I (4)
Advanced Research of Naval Architecture II (4)
Advanced Research of Naval Architecture III (6)
Advanced Lecture on Ship Design (4)
Advanced Lecture on Ship Motions (4)
Advanced Lecture on Ship Structure (4)
Advanced Lecture on Engineering Work on Ship Building (2)
Advanced Lecture on Special Ship Design (2)

I. University of Tokyo
Bunkyo-ku
Tokyo 113
Japan

IIa. Department of Marine Engineering
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Engineering
B. Changes every two years

IIb. Department of Naval Architecture
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
3. Doctor of Engineering
B. Changes every two years

IIIa. Marine Engineering
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree
2. Doctor's Program: Master's Degree
B. Degree Requirements
1. Master of Engineering: 30 credits; thesis
2. Doctor of Engineering: 20 credits; dissertation
C. Options or Information: unknown

IIIb. Naval Architecture
A. Prerequisites to Enter Program
1. Master's Program: Bachelor's Degree
2. Doctor's Program: Master's Degree
B. Degree Requirements
1. Master of Engineering: 30 credits; thesis; three year time limit
2. Doctor of Engineering: 20 credits; dissertation; five year time limit
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credits)
A. Marine Engineering
1. Master's Program
776-01 Strength and Physics of Materials (2)
02 Advanced Lectures on Fluid Engineering A (2)
03 Advanced Heat Transfer (2)
04 Advanced Lectures on Heat Engines (2)
05 Advanced Lectures on Internal Combustion Engines (2)
06 Mechanics of Internal Combustion Engines (2)
07 Gas Turbine (2)
08 Advanced Course of Mechanical Engineering Laboratory (4)
Advanced Exercise in Mechanical Engineering I (6)
Special Lectures on Mechanical Engineering III (2)
2. Doctor's Program
Advanced Exercises in Mechanical Engineering II (10)

B. Naval Architecture
1. Master's Program
778-01 Fracture and Strength of Materials I (2)
02 Fracture and Strength of Materials II (2)

778-03 Hull Form Design (2)
04 Structural Design with Composite Materials I (2)
05 Structural Design with Composite Materials II (2)
06 Theory of Elasticity (2)
07 Analysis of Structures
08 Design of Ships
09 Information Analysis (2)
10 Advanced Theory of Ship Dynamics I (2)
11 Advanced Theory of Ship Dynamics II (2)
12 Theory of Viscous Resistance (2)
13 Advanced Fluid Mechanics (2)
14 Applied Plastic Analysis of Structures (2)
15 Thin Plate Structural Analysis (2)
16 Applied Stress Analysis - Experimental Measurement (2)
17 Dynamics of Mooring Systems
18 Special Vessels
19 Experiments in Naval Architecture (2)
20 Exercises on Naval Architecture A (4)
21 Exercises on Naval Architecture B (4)
22 Advanced Study in Naval Architecture B (8)
23 Special Lecture on Naval Architecture II (2)

2. Doctor's Program
778-51 Advanced Study in Naval Architecture II (10)

I. Yokohama National University
156 Tokiwa-dai, Hodogaya-ku
Yokohama 240
Japan

II. Department of Naval Architecture and Ocean Engineering
A. Degrees Offered
1. Bachelor of Engineering
2. Master of Engineering
B. Changes annually

III. Naval Architecture and Ocean Engineering
A. Bachelor's Degree from a Japanese university; foreign students having completed a 16-year course of formal education or who are recognized to be equal or superior in scholastic attainments to graduates from a Japanese university
B. Two academic years in residence; 30 graduate course credits, including 8 in basic sciences; thesis
C. Options or Information: none

IV. Postgraduate Courses or Subjects (credits)
Vibration of Ship Hull (2)
Ship Hydrodynamics I (2)
Ship Hydrodynamics II (2)
Theory of Ship Motions I (2)
Theory of Ship Motions II (2)
Advanced Design of Ships I (2)
Advanced Design of Ships II (2)
Advanced Theory of Ship Motion I (2)
Advanced Theory of Ship Motion II (2)
Special Topics in Ship Hydrodynamics I (2)
Special Topics in Ship Hydrodynamics II (2)
Advanced Theory of Structural Analysis of Ships I (2)
Advanced Theory of Structural Analysis of Ships II (2)
Advanced Theory of Design of Ocean Structures I (2)
Advanced Theory of Design of Ocean Structures II (2)

I. International Institute for Hydraulic
and Environmental Engineering
Oude Delft 95
2611 BD Delft
Netherlands

II. Tidal and Coastal Engineering
A. Postgraduate diploma in hydraulic engineering
B. Professor Ir. L.J. Mostertman

III. Coastal and Harbour Engineering
A. A degree in engineering or a related subject; at least three years of practical experience
B. Eleven months of study: design thesis
C. Options or Information
1. Harbour Section: port management and harbour construction
2. Marine Section: coastal hydraulics and coastal engineering

IV. Postgraduate Coures or Subjects
Hydraulics
Sediment Transportation
Short Waves
Tides
Density Currents
Coastal Engineering
Breakwater Design
Coastal Measurements
Electronic Positioning
Dredging and Dredging Equipment
Computer Programming
Statistics
Engineering Economy
Option 1:
Merchant Shipping
Port Planning
Port Administration
Option 2:
Hydraulic Scale Models
Dikes
Oceanology
Advanced Coastal Engineering

I. Technische Hogeschool Delft
(Delft University of Technology)
Stevinweg 1
2600 GA Delft
Netherlands

IIa. Department of Civil Engineering
A. "Civil Engineer" (equivalent to a Master's Degree)
B. Professor Dr.-Ir. E. W. Bijker

IIb. Department of Shipbuilding and Shipping
A. Degrees Offered
1. Ingenieur (equivalent to Master of Science)
2. Doctor's Degree
B. Professor Dr. Ing. C. Gallin
(Chairman of Program Committee: Professor Dr. Ir. J.D. van Manen)

IIIa. Coastal Engineering
A. Basic study in Civil Engineering with some emphasis in hydraulics (equivalent to a U.S. Bachelor of Science in Civil Engineering with a hydraulics major)
B. 24 credits; thesis
C. Options or Information
1. Concrete Structures Group under Prof. Ir. A.S.G. Bruggeling with an offshore structures option
2. Steel Structures Group under Prof. Ir. A.A. van Douwen, offshore structures option
3. Other possibilities include Fluid Mechanics, Hydraulic Structures, Applied Mechanics, and Foundation Engineering

IIIb. Naval Architecture
A. Unknown
B. Five years for Ingenieur, 3 additional years for Doctor plus thesis
C. Options or Information
1. Offshore engineering by research
2. Participation in activities of the Working Group in Offshore Technology (WOT), in collaboration with the Departments of Civil Engineering, Mechanical Engineering, and Mining Engineering
3. The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT). The Secretariat of WEGEMT is at Delft.

IV. Postgraduate Courses or Subjects (credits: each represents 40 hours of work)
A. Coastal Engineering
Required Courses
Short Waves (3)
Wind Waves (2)
Breakwater Design (1 and 2 below) (1)
Advanced Coastal Engineering (3 below) (3)
Advanced Coastal Engineering (3)

1. Harbour and Harbour Entrances
   Statistics (2)
   Queueing Theory (2)
   Operations Analysis (2)
   Discrete Simulations (2)
   Applied Statistics (2)
   Theory of Systems (2)
   Dynamics (2)
   Theory of Elasticity (2)
   Hydraulic Model Theory (1)
   Density Currents (2)
   Functional Design (3)
   Design Methods (1)
   Merchant Shipping (2)
   Hydrographic Surveys (2)
   Foundations Engineering (2)
   Dredging Equipment (2)
2. Coastal Morphology
   Probability Statistics (4)
   Numerical Analysis (2)
   Theory of Fluid Flow (4)
   Hydraulic Model Theory (1)
   Density Currents (2)
   Turbulence (2)
   Hydraulic Computations (2)
   Sediment Transport (1)
   Dredging Equipment (2)
3. Offshore Engineering
   Dynamics of Structures A (2)
   Dynamics of Structures B (2)
   Shells (2)
   Plasticity Theory (2)
   Tides (1)
   Short Waves (3)
   Wind Waves (2)
   Breakwater Design (1)
   Hydraulic Structures A (2)
   Hydraulic Structures B (1)
   Introduction to Coastal Engineering (2)
   Advanced Coastal Engineering (3)
   Merchant Shipping (2)
   Steel Hydraulic Structures (1)
   Topics in Steel Structures (varies)
   Fatigue (1)
   Prestressed Concrete (1)
   Temperature Effects in Concrete (1)
   Foundations Engineering (2)
4. Concrete Structures (Required)
   Dynamics (2)
   Shells (2)
   Plasticity Theory (2)
   Computation and Detailing of Concrete Structures (2)

Concrete Mix Design (2)
Prefabrication (1)
Plus Electives

5. Steel Structures (Required)
Dynamics (2)
Shells (2)
Plasticity Theory (2)
Steel Structures (2)
Fatigue (1)
Alloys (2)
Applied Welding (2)

6. Elective Courses in Civil Engineering
Dynamics of Structures A (2)
Dynamics of Structures B (2)
Shells (2)
Plasticity Theory (2)
Tides (1)
Short Waves (3)
Wind Waves (2)
Breakwater Design (1)
Hydraulic Structures A (2)
Hydraulic Structures B (1)
Introduction to Coastal Engineering (2)
Advanced Coastal Engineering (3)
Merchant Shipping (2)
Steel Hydraulic Structures (1)
Topics in Steel Structures (varies)
Fatigue (1)
Prestressed Concrete (1)
Temperature Effects in Concrete (1)
Foundations Engineering (2)

7. Elective Courses Outside of Civil Engineering
Optimization of Functions (2)
Systems Models and Simulation (4)
Resistance and Propulsion of Ships (2)
Steering and Sea Keeping (2)
Corrosion and Corrosion Protection (2)
Astronomical and Satellite Geodesy (3)
Offshore Geodesy (2 1/2)
Introduction to Offshore Engineering (3) *
Budgeting and Investment Decisions (2)

B. Naval Architecture
None

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* Course given collectively by the Departments of Mining Engineering, Civil Engineering, Geodesy, Naval Architecture, Mechanical Engineering, Materials Engineering

I. University of Auckland
Private Bag
Auckland
New Zealand

II. Department of Civil Engineering
A. Degrees Offered
1. Master of Philosophy (research degree)
2. Doctor of Philosophy (research degree)
B. Professor A. J. Raudkivi

III. Coastal and Offshore Engineering
A. Bachelor's Degree or equivalent
B. Seminars; research; thesis or project
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects
Coastal Engineering
Fluid Mechanics Seminar

I. University of Canterbury
Christchurch
New Zealand

II. Department of Civil Engineering
A. Master of Civil Engineering
B. Professor R. Park

III. Coastal Engineering
A. Bachelor of Civil Engineering, or equivalent
B. 6 course-work papers; research report
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (Each course 20 hours plus 10 afternoon sessions)
Coastal Engineering
Prestressed Concrete
Continuum Mechanics
Geomechanics
Probabilistic Design
Open Channel Hydraulics
Transportation Planning
Hydrology
Seismology
Structural Steel

I. Norges Tekniske Høgskole
(Norwegian Institute of Technology)
N-7034 Trondheim - NTH
Norway

IIa. Department of Civil Engineering, Section of Port and Ocean Engineering
- A. Degrees Offered
  1. Professional Degree: Civil Engineering corresponding to Master of Science
  2. Doctoral Degrees: Doctor of Engineering; Doctor of Technology
- B. Professor Geir Moe

IIb. Department of Marine Technology
- A. Degrees Offered
  1. Professional Degree: Civil Engineering corresponding to Master of Science
  2. Doctor of Engineering
  3. Doctor of Technology
- B. Head of Department: unknown

IIIa. Port and Ocean Engineering
- A. Acceptance after evaluation of candidate's application
- B. Degree Requirements
  1. Professional Degree: 4.5 years; thesis
  2. Doctoral degrees: a professional degree in engineering or science; Doctor of Engineering: courses, thesis; Doctor of Technology: thesis
- C. Options or Information: none

IIIb. Marine Technology
- A. Prerequisites to Enter Program
  1. Acceptance after evaluation of candidate's application
  2. Civil Engineering (Master of Science) or equivalent
  3. Civil Engineering with grade "satisfactory" or better; or equivalent
- B. Degree Requirements
  1. Civil Engineering: courses and thesis. 4 1/2 years study
  2. Doctor of Engineering: Courses and thesis
  3. Doctor of Technology: Thesis
- C. Options or Information
  Specializations: Marine Hydrodynamics, Structures, Machinery Systems, or Design

IV. Postgraduate Courses or Subjects
- A. Port and Ocean Engineering
  Marine Technology
  Marine Environment
  Recent Wave Theories
  Numerical Methods for Hydrodynamical Problems
  Courses in other sections of the Civil Engineering Department or in other departments

B. Civil Engineering

1. Mandatory

General courses (2 1/2 years)

Marine Technology courses (1/2 year):

80520 Ship Design
80551 Ship Yard Technology
81020 Marine Structures
81521 Marine Hydrodynamics
82011 Marine Machinery

Project work (about 8 weeks in the eighth semester)

2. Optional courses (selection of 7 or 8 in the 7th and 8th semester):

80011 Analysis of Uncertainty
80040 Dynamic Analysis of Simple Mechanical Systems
80060 Process Application of Minicomputers
80526 Operation Research Applied to Marine Systems
80527 Design of Sea Transport System
80529 Vessels and Equipment for Underwater Operations
80532 Marine Traffic Engineering
80553 Cad/cam of Ships and Platforms
81055 Strength of Materials for Marine Structures
81056 Matrix Methods in Structural Analysis
81059 Buckling and Collapse of Structures
81526 Sealoads and Motions of Marine Structures
81528 Resistance and Propulsion
81535 Ocean Environment Description
81542 Experimental Methods in Marine Hydrodynamics
82048 Measuring Methods for Marine Machinery
82051 Hydraulic Systems
82053 Modelling and Simulating of Machinery Systems
82511 Internal Combustion Engines
82512 Engine Components and Design
82513 Engine Dynamics
80528 Ship Operation and Maintenance
80531 Damage Stability
80533 Design and Operation of Offshore Crafts
80554 Management of Fabrication of Ships and Platforms
80561 Fishing Vessel Design
81051 Optimum Structural Design
81053 Finite Element Methods in Structural Analysis
81054 Dynamic Response of Marine Structures
81058 Design of Offshore Structures
81527 Sealoads and Motions of Ships
81529 Steering and Manoeuvring
81537 Probabilistic Theory of Sealoads
82054 Control and Instrumentation in Marine Engineering
82515 High Speed Engines
82516 Operation and Maintenance of Marine Diesel Engines
83030 Ship Systems
83030 Cargo Handling - Dangerous Goods

C. Doctor of Engineering

Selection of 5 to 8 courses given in 3rd or 4th year of study for the civil engineering degree or postgraduate courses offered in any department of the Institute. A minimum of 1

to 2 doctoral courses is required. The course program implies one year of full-time study.

80570 Shipping and Transport Economics
80571 Active Fishing Methods
80572 Theory of Design
81057 Structural Reliability
81061 Advanced Techniques for Collapse Analysis of Marine Structures
81062 Stochastic Methods Applied in the Analysis of Marine Structures
81575 Hydrodynamic Aspects of Marine Structures I
81578 Hydrodynamic Aspects of Marine Structures II
81579 Non-linear Stochastic Problems in Marine Hydrodynamics I
81580 Non-linear Stochastic Problems in Marine Hydrodynamics II
81581 Hydrodynamic Aspects of Marine Structures III
82055 Advanced Modelling of Machinery Systems
82555 Mechanical Vibrations
82557 Analysis of Processes in Hermofluid Systems
82558 Combustion and Exhaust Emission in Diesel and Otto Engines

I. Instituto Hidrográfico
(Hydrographic Institute)
Rua das Trinas, 49
1296 Lisboa Codex
Portugal

II. School of Hydrography and Oceanography
A. Non-degree postgraduate level course in hydrography and oceanography
B. CDR Carlos F. D. Souto, E.H., Portuguese Navy

III. Specialization Course in Hydrography
A. Bachelor's Degree in Engineering or Physical Sciences (e.g. physics, geology, geophysics, etc.)
B. Formal instruction - 8 months; projects, field work and visits - 3 months
C. Options or Information
Intention to obtain a class A certification by the FIG/CHI Advisory Board

IV. Courses and Subjects (number of hours)
Geodesy (76)
Geodetic Surveying (64)
Hydrographic Surveying (63)
Hydrographic and Geodetic Instrumentation (102)
Cartography (106)
Tides and Currents (51)
Marine Geophysics (24)
Remote Sensing (30)
Wave Theory (32)
Coastal Oceanography (28)
Physical Oceanography (95)
Coastal and Harbour Engineering (26)
Law of the Sea (10)
Mathematics and Physics Review (78)
Computer Science (63)

I. Instituto Superior Tecnico
(Technical University of Lisbon)
Av. Rovisco Pais
1096 Lisboa Codex
Portugal

II. Department of Mechanical Engineering
A. Degree in Naval Architecture
B. Professor Dr. Luciano Faria

III. Naval Architecture Course
A. Engineering Degree, Doctor of Philosophy
B. Course work of 5 years (engineering degree)
C. Options or Information
Doctor of Philosophy in the following fields:
1. Structures
2. Hydrodynamics and Propulsion
3. Marine Engines and Systems
4. Design, Naval Architecture

IV. Postgraduate Courses
Naval Architecture I and II
Ship Structures I and II
Mechanics and Ship Stability I and II
Shipyard Technology
Marine Hydrodynamics I and II
Ship Design I and II
Ship's Electrical and Electronic Systems I and II
Marine Engines and Systems I and II
Marine Economics
Welding Technology
Structure Design
Ships Dynamics
Structural Dynamics

I. Busan National University
San 30 Jangjeon-dong, Dongnai-ku
Busan 607
Republic of Korea

II. Department of Naval Architecture
A. Degrees Offered
1. Master of Science
2. Doctor of Engineering
B. Professor Jin An Kim

III. Naval Architecture
A. Prerequisites to Enter Program
1. Master of Science: 4-year college graduate; entrance examination on Naval Architecture and English
2. Doctor of Engineering: Master of Science Degree; entrance examination in major fields and two foreign languages including English
B. Degree Requirements
1. Master of Science: more than 24 credit hours with grades B or better; language examination; thesis
2. Doctor of Engineering: more than 36 credit hours with a grade of B or better; language examinations; dissertation
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credit hours)
Ship Hydrodynamics I (3)
Ship Hydrodynamics II (3)
Boundary Layer Theory (3)
Ship Structural Mechanics I (3)
Ship Structural Mechanics II (3)
Basic Design of Ships (3)
Advanced Theory of Ship Resistance I (3)
Advanced Theory of Ship Resistance II (3)
Advanced Theory of Ship Propulsion I (3)
Advanced Theory of Ship Propulsion II (3)
Advanced Theory of Ship Motion I (3)
Advanced Theory of Ship Motion II (3)
Stress Analysis (3)
Theory of Plates and Shells (3)
Theory of Plasticity (3)
Advanced Theory of Ship Vibration (3)
Dynamics Responses of Ship Structures (3)
Welding Engineering (3)
Welding Mechanics (3)
Special Ships (3)
Advanced Structural Analysis of Ships (3)
Special Topics in Naval Architecture I (3)
Special Topics in Naval Architecture II (3)
Special Topics in Naval Architecture III (3)

I. Inha University
253 Youngyeon-dong, Nam-ku
Incheon 160-02
Republic of Korea

II. Department of Naval Architecture
A. Degrees Offered
1. Master of Science
2. Doctor of Engineering
B. Professor Tai Jun Chung

III. Naval Architecture
A. Prerequisites to Enter Program
1. Master of Science: 4-year college graduate; entrance examination on Naval Architecture and English
2. Doctor of Engineering: Master of Science Degree; entrance examination in major fields and two foreign languages including English
B. Degree Requirements
1. Master of Science: more than 30 credit hours with a grade of B or better; language examinations; thesis
2. Doctor of Engineering: more than 36 credit hours with a grade of B or better; language examinations; dissertation
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credit hours)
Ship Hydrodynamics (3)
Theory of Viscous Resistance (3)
Theory of Wavemaking Resistance (3)
Advanced Theory of Ship Motion I (3)
Advanced Theory of Ship Motion II (3)
Theory of Ship Maneuverability (3)
Theory of Ship Propulsion I (3)
Theory of Ship Propulsion II (3)
Ship Structural Mechanics (3)
Advanced Structural Analysis of Ships (3)
Applied Dynamics (3)
Theory of Ship Vibration (3)
Marine Power Plant (3)
Special Ships (3)
Ship Design I (3)
Ship Design II (3)
Special Topics in Naval Architecture I (3)
Special Topics in Naval Architecture II (3)

I. Ulsan Institute of Technology
San 29 Mugeo-dong
Ulsan, Kyungsangnam-do 690
Republic of Korea

II. Department of Naval Architecture
A. Master of Science
B. Professor Dong Kee Lee

III. Naval Architecture
A. 4-year college graduate; entrance examination on Naval Architecture and English
B. More than 24 credit hours with a grade of B or better; language examination; thesis
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credit hours)
Continuum Mechanics (3)
Numerical Analysis of Continua (3)
Advanced Mechanics of Materials (3)
Advanced Fluid Mechanics (3)
Advanced Welding Engineering (3)
Theory of Plates and Shells (3)
Advanced Theory of Ship Vibration (3)
Ship Structure Analysis (3)
Theory of Plasticity (3)
Boundary Layer Theory (3)
Advanced Theory of Ship Resistance (3)
Design of Propulsion System (3)
Dynamics of Floating Bodies (3)
Ship Performances at Sea (3)
Shipyard Layout and Shipbuilding (3)
Engineering Management (2)
Operational Research (3)
Basic Design of Ships (3)
Current Topics in Shipbuilding Science (3)
Current Topics in Ship Structures (2)
Current Topics in Ship Performances (2)
Current Topics in Naval Architecture (3)

I. Seoul National University
San 56-1 Shinrim 2-Dong, Kwanak-Ku
Seoul 151
Republic of Korea

II. Department of Naval Architecture
A. Degrees Offered
1. Master of Science
2. Doctor of Engineering
B. Professor Keuck Chun Kim

III. Naval Architecture
A. Prerequisites to Enter Program
1. Master of Science: 4-year college graduate; entrance examination on Naval Architecture and English
2. Doctor of Engineering: Master of Science Degree; entrance examinations in major field; English and German or French
B. Degree Requirements
1. Master of Science: more than 24 credit hours with a grade of B or better; language examination; thesis
2. Doctor of Engineering: more than 36 credit hours with a grade of B or better; language examinations; dissertation
C. Options or Information: none

IV. Postgraduate Courses or Subjects (credit hours)
Stress Analysis (3)
Special Ships (3)
Advanced Ship Design (3)
Advanced Ship Resistance and Propulsion (3)
Ship Propeller Design (3)
Advanced Theory of Floating Body Motion I (3)
Advanced Theory of Floating Body Motion II (3)
Design of Ship Propulsion System (3)
Advanced Wave Dynamics (3)
Advanced Ship Hydrodynamics I (3)
Advanced Ship Hydrodynamics II (3)
Advanced Theory of Ship Vibration I (3)
Advanced Theory of Ship Vibration II (3)
Advanced Ship Structural Mechanics I (3)
Advanced Ship Structural Mechanics II (3)
Welding Mechanics I (3)
Welding Mechanics II (3)
Advanced Maneuverability of Ship (3)
Ship Economics (3)
Analytical Method in Vibration Analysis (3)
Theory of Ship Structure I (3)
Theory of Ship Structure II (3)
Floating Body Dynamics (3)
Theory of Wavemaking Resistance (3)
Theory of Viscous Resistance (3)
Advanced Buoy Engineering (3)
Lifting Surface Theory (3)

Advanced Hull Structural Design (3)
Theory of Propulsion (3)
Cavitation Theory (3)
Surface Wave Theory I (3)
Surface Wave Theory II (3)
Special Problems in Ship Propulsion System (3)
Statistical Methods in Ocean Engineering (3)
Slender Body Theory (3)
Special Problems in Naval Architecture (3)
Special Problems in Ocean Engineering (3)
Studies in Naval Architecture (3)
Studies in Ocean Engineering (3)

I. National University of Singapore
Kent Ridge
Singapore 0511
Singapore

II. Department of Civil Engineering
A. Master of Science in Civil Engineering
B. Professor S. L. Lee

III. Coastal and Hydraulic Engineering
A. Bachelor of Engineering in Civil Engineering
B. 8 courses
C. Options or Information
Electives in Structural, Geotechnical, Hydraulic, Environmental and Transportation Engineering

IV. Postgraduate Courses or Subjects (credits)
Coastal Hydraulics (3)
Coastal Engineering (3)
Offshore Structures (3)
Plus courses in allied fields of Civil Engineering

I. Chalmers Tekniska Hogskole
(Chalmers University of Technology)
Horsalsvägen 1
S-412 96 Goteborg
Sweden

II. Division of Ship Hydrodynamics
A. Degrees Offered
1. Civilingenjör (Master of Science)
2. Teknologie Licentiat
3. Teknologie Doktor (Dph)
B. Professor C. Falkemo

III. Ship Hydrodynamics, Underwater Technology
A. Prerequisites to Enter Program
1. Civilingenjör: secondary school graduate
2. Teknologie Licentiat: Civilingenjör Degree
3. Teknologie Doktor: Civilingenjör Degree; knowledge of English
B. Degree Requirements
1. Civilingenjor: 4 years of studies
2. Teknologie Licentiat: individualized program of studies including required and elective courses
3. Teknologie Doktor: 4 years of studies; 40 units of courses; thesis
C. Options or Information
The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IV. Postgraduate Courses or Subjects: unknown

I. The Royal Institute of Technology
S-100 44 Stockholm
Sweden

II. Division of Naval Architecture
A. Unknown
B. Professor Dr. Ing. E. Steneroth (?)

III. Naval Architecture*
A. Unknown
B. Unknown
C. Options or Information
The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IV. Postgraduate Courses or Subjects
Unknown

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* Understood to have relevant program, but details unknown.

I. Cranfield Institute of Technology
Cranfield, Bedford MK43 0AL
United Kingdom

II. 1. Department of Materials
2. Department of Design
A. Master's and Doctor's Degrees in Offshore Engineering
B. Name of Program Head or Director
1. Dr. J. Billingham
2. Dr. C. Kirk

III. Offshore Engineering
A. Bachelor of Science in science or engineering or Higher National Diploma plus industrial experience
B. Course work; thesis
C. Options or Information
1. Materials and Welding Technology
2. Structural Design

IV. Postgraduate Courses or Subjects
A. Department of Materials
Design of Offshore Structures
Industrial Management
Materials Selection
Corrosion and Corrosion Protection
Fracture Mechanics
Quality Assurance
Nondestructive Testing
Welding Design
Welding Processes
Welding Metallurgy
B. Department of Design
Design of Offshore Structures
Ocean Wave Dynamics
Probabilistic Design and Random Vibrations
Materials Selection
Welding Design
Theory of Structures and Strength of Materials

I. Glasgow College of Technology
Cowcaddens Road
Glasgow G4 OBA
United Kingdom

II. Department of Mechanical and Civil Engineering
A. Postgraduate Diploma in Offshore Engineering
B. Mr. Frank Thomson

III. Offshore Engineering
A. Engineering degree or equivalent
B. Project and written papers in subjects listed below
C. Options or Information: none

IV. Postgraduate Courses or Subjects
Design of Structures
Drilling Technology
Fluid Transportation
Construction and Maintenance of Structures
Geology and Reservoir Engineering
Operation Planning and Control

I. Liverpool Polytechnic
Faculty of Engineering
Byrom Street
Liverpool L3 3AF
United Kingdom

II. Department of Maritime Studies
A. Degrees Offered
1. Bachelor of Science in Nautical Studies; also, with honours
2. Master of Science in Shipping and Maritime Studies
B. Captain L. A. Holder

III. Shipping and Maritime Studies
A. Honours degree or equivalent
B. Twelve months with dissertation
C. Options or Information
1. Shipping and Port Management and Economics
2. Marine Insurance and Maritime Law
3. Shipping Operations

IV. Postgraduate Courses or Subjects
Short technical courses, including ARPA, Radar Simulator; annual lectures and seminar programme with the Nautical Institute and the Royal Institute of Navigation

I. Newcastle upon Tyne Polytechnic
Ellison Place
Newcastle upon Tyne NE1 8ST
United Kingdom

II. Faculty of Engineering
A. Postgraduate Diploma in Offshore Materials and Corrosion Engineering
B. Dr. G. Needham

III. Offshore Materials and Corrosion Engineering
A. First Degree or Higher National Diploma in Engineering or Applied Sciences (chemical or physical), or equivalent professional qualifications
B. Lectures; seminars; laboratory sessions; industrial visits
C. Options or Information
Joint program with the Robert Gordon's Institute of Technology, Aberdeen

IV. Postgraduate Courses or Subjects
Principles of Corrosion and Corrosion Engineering Practice
Welding Processes/Offshore Welding Technology
Non-destructive Testing
Design/Terotechnology
Mechanics and Fracture Analysis
Structural Properties of Engineering Materials

I. Plymouth Polytechnic
Drake Circus
Plymouth, Devon PL4 8AA
United Kingdom

II. Department of Marine Science
A. Postgraduate Diploma in Hydrographic Surveying
B. Captain K. D. MacCallum

III. Hydrographic Surveying
A. One of the following
1. First Degree in an associated discipline
2. Full or corporate membership of an appropriate professional body
3. Certificate of Competency as Master of a foreign-going steamship
4. Employer's sponsorship with practical experience
5. Appropriate overseas qualifications
B. 9 month course of study; project
C. Options or Information: none

IV. Postgraduate Courses or Subjects
A. Section 1
Topographic Survey
Cartography and Photography
Survey Mathematics
Oceanography
Sediment Production
Meteorology
Ports and Ocean Industry
Civil Engineering
B. Section 2
Hydrographic Survey
Marine Geophysics and Geotechnics
Legal Aspects of Hydrographic Survey
Dredging and Conservancy
Computer Assisted Surveying

I. Robert Gordon's Institute of Technology
Schoolhill
Aberdeen AB9 1FR
United Kingdom

II. School of Mechanical and Offshore Engineering
A. Degrees Offered
1. Postgraduate Diploma (CNAA) in Offshore Engineering
2. Postgraduate Diploma (CNAA) in Offshore Materials and Corrosion Engineering
3. Master of Philosophy
4. Doctor of Philosophy
B. Name of Program Head or Director
1. Mr. J.G. Black
2. Dr. D. Kirkwood

III. Name of Program
1. Offshore Engineering
2. Offshore Materials and Corrosion Engineering
A. Prerequisites to Enter Program
1. Degree in Engineering; degree in an appropriate science; an HND in engineering plus appropriate experience
2. First Degree or HND in Engineering or Applied Sciences (chemical or physical); equivalent professional qualification
B. Degree Requirements (Diploma only)
1. 34 weeks; courses and project or laboratory
2. 30 weeks; half in Newcastle, half in Aberdeen
C. Options or Information
The Offshore Materials and Corrosion Engineering program is joint with the Newcastle upon Tyne Polytechnic

IV. Postgraduate Courses or Subjects
A. Offshore Engineering
Safety and Survival
Drilling Technology
Oil and Gas Production Technology
Geology and Reservoir Engineering
Planning and Control of Offshore Operations
Diving and Underwater Operations
Project Activity
Offshore Structures
Offshore Materials Technology
B. Offshore Materials and Corrosion Engineering
Principles of Corrosion and Corrosion Engineering Practice
Welding Processes/Offshore Welding Technology
Non-destructive Testing
Design/Terotechnology
Mechanics and Fracture Analysis
Structural Properties of Engineering Materials

I. Royal Naval Engineering College
Plymouth
United Kingdom

II. Education Department
A. Degrees Offered
1. Bachelor of Science
2. Master of Science
B. Name of Program Head or Director
Bachelor of Science: Captain A. O. Holding
Master of Science: Commander B. D. Dear

III. Marine Engineering
A. First degree with honors in an appropriate engineering discipline
B. Unknown
C. Options or Information
1. Gas Turbine
2. Steam Plant
3. Electrical Engineering

IV. Postgraduate Courses or Subjects
Unknown

Ia. University College London
Torrington Place
London WC1E 7JE
United Kingdom

Ib. University College London
Gower Street
London WC1E 6BT
United Kingdom

IIa. Department of Mechanical Engineering
A. Degrees Offered
1. Bachelor of Science in Naval Architecture (with honors)
2. Master of Science in Naval Architecture
3. Master of Science in Marine Engineering
B. Dr. R. Eatock Taylor

IIb. Department of Mechanical Engineering
A. Master of Science
B. Dr. R. Eatock Taylor

IIIa. Naval Architecture; Marine Engineering
A. Graduate of approved university with first or second class honours degree in an appropriate discipline, or equivalent
B. Written examination
C. Options or Information
The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IIIb. Ocean Engineering
A. Engineering degree with sound background in applied mechanics
B. Written examinations and a project
C. Options or Information
See IIIa. C., above

IV. Postgraduate Courses or Subjects
A. Naval Architecture (lecture hours)
1. Ship Structures (80)
2. Ship Dynamics (70)
3. Ship Hydrodynamics (58)
4. Other subjects, e.g. Ship Design (50)
B. Marine Engineering (lectures)
1. Automatic Control and Computing (46)
2. Dynamics, including Random Vibration and Acoustics (52)
3. Thermodynamics, including Turbo-machinery and Air-conditioning (54)
4. Mechanical Design (55)
5. Electronic and Electrical Systems (40)
6. Power and System Dynamics (54)
7. Electrical Design (45)

C. Ocean Engineering (lectures)
Design of Offshore Platforms (40)
Design of Structures Against External Pressure (25)
Wave Loads and Dynamics of Floating Offshore Structures (45)
The Sea as a Random Process (20)
Materials in a Marine Environment (20)
Foundations for Offshore Structures (10)
Maritime Law (10)
Marine Geology (10)
Man in the Sea (5)
Economic Aspects (10)
Instrumentation (5)

I. University College of North Wales
Bangor LL57 2DG
United Kingdom

II. Marine Science Laboratories
A. Master of Science
B. Mr. D. Taylor Smith

III. Marine Geotechnics
A. Honors Degree in Geology (with mathematics or physics), physics, civil engineering, or electronics
B. Formal instruction 6 months; research project 6 months; also, literature review, field simulations and shipboard training
C. Options or Information
Areas emphasized are:
1. Transport and deposition of continental margin and deepsea sediments
2. Sediment engineering properties after sedimentation
3. Geophysical techniques of examining sediment properties in situ

IV. Postgraduate Courses or Subjects *
Fundamental Physical Principles
Introductory Fluid Mechanics
Fundamentals of Marine Acoustics
Elements of Wave and Tidal Theory
Distribution of Physical and Chemical Properties
Geotechnical Properties of Marine Sediments
Turbulence
Marine Geophysics
Electrical Surveying
External Controls of Sedimentation
Transport Processes and Shelf Sediments
Beach and Coastal Geomorphology
Instrumentation
Statistics and Time Series Analysis
The Continental Margin
The Deep Ocean Floor
Advanced Dynamical Theory
Advanced Wave Theory
Large-Scale Circulation
Engineering Seismology I
Ground and Structural Vibrations
Shelf Sea Dynamics and Mixing Processes

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* Includes both marine geotechnics and physical oceanography.

I. Univeristy of Glasgow
Glasgow G12 8QQ
United Kingdom

II. Department of Naval Architecture and Ocean Engineering
A. Degrees Offered
1. Bachelor of Science in Engineering
2. Master of Science
3. Doctor of Philosophy
B. Professor D. Faulkner

III. Naval Architecture and Ocean Engineering
A. For research study, good Honours Degree or equivalent in engineering, mathematics or physics
B. Degree Requirements
1. Master of Science: two years research; thesis
2. Doctor of Philosophy: three years research; thesis
C. Options or Information
Research programs:
1. Offshore Structures
2. Dynamics of Compliant Structures
3. Hydrodynamics of Offshore Engineering Designs and Ships
4. Design Optimization for a Range of Structures and Vehicles
The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IV. Postgraduate Courses or Subjects
Only short courses to provide theoretical and practical training in the latest offshore technology for practicing engineers

I. University of Liverpool
P.O. Box 147
Liverpool L69 3BX
United Kingdom

II. Department of Civil Engineering
A. Degrees Offered
1. Diploma
2. Master's Degree
B. Miss M. A. Revell (principal contact for admission forms to both universities - see III. C., below)

III. Maritime Civil Engineering
A. Good university degree or an equivalent qualification in civil engineering
B. Degree Requirements
1. Diploma: two terms of lectures, exercises, and coursework; project lasting 3 months
2. Master's Degree: two terms of lectures, exercises, and course work; project lasting 6 months
C. Options or Information
Intended of engineers interested in the design, construction and maintenance of civil engineering works in:
1. Offshore and coastal zone, such as port approaches, coastal protection works, and offshore installations
2. Estuaries, harbours and ports
(Joint program with the University of Manchester, Simon Engineering Laboratories, Oxford Road, Manchester M13 9PL)

IV. Postgraduate Courses or Subjects
A. General Subjects
Estuary Engineering
Coastal and Offshore Engineering
Basic Structural Analysis
Maritime Environment
Computer Programming
B. Option 1
Foundation Engineering
Management
Design of Offshore Structures
C. Option 2
Marine Transport
Ship Dynamics
Pollution
Port Structures

I. University of Manchester
Simon Engineering Laboratories
Oxford Road
Manchester M13 9PL
United Kingdom

II. See University of Liverpool (Joint Program)

I. University of Newcastle upon Tyne
Newcastle upon Tyne NE1 7RU
United Kingdom

II. School of Marine Technology
A. Degrees Offered
1. Bachelor of Science
2. Master of Science
3. Diploma in Marine Engineering
4. Diploma in Marine Technology
5. Doctor of Philosophy
B. Name of Program Head or Director
1. Department of Marine Engineering: Professor R. V. Thompson
2. Department of Naval Architecture and Shipbuilding:
Professor J. B. Caldwell

III. Marine Technology (Naval Architecture and Shipbuilding)
A. First Degree in appropriate discipline
B. Degree Requirements
1. Master of Science by Advanced Course
2. Master of Science by Research
3. Doctor of Philosophy by Research
C. Options or Information
1. Marine Technology
2. Marine Engineering
The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IV. Postgraduate Courses or Subjects
A. Marine Technology (Master of Science by Advanced Course: Course 9277)
Shipbuilding Science
Ship Propulsion and Performance
Ship Structures and Materials
Marine Transport
Marine Design
Marine Machinery Systems
Ocean Engineering
Marine Transmission Systems
B. Naval Architecture and Shipbuilding
(Master of Science Research: Course 9169)
C. Marine Engineering (Master of Science by Advanced Course: Course 9276)
D. Marine Engineering (Master of Science by Research: Course 9165)
E. Diploma In Marine Engineering
1. Required for Examination
Marine Engineering III
Naval Architecture E 11

2. Three Subjects from the Following
   Applied Electronics
   Automatic Control
   Economics for Engineers
   Metallurgy E 111
   Internal Combustion Engines
   Turbomachines

F. Marine Engineering (Doctor of Philosophy by Research: Course 9065

G. Naval Architecture and Shipbuilding (Doctor of Philosophy by Research: Course 9069)

Ia. University of Strathclyde
John Anderson Building
107 Rottenrow
Glasgow G4 ONG
United Kingdom

Ib,c. University of Strathclyde
Livingstone Tower, 26 Richmond Street
Glasgow G1 1XH
United Kingdom

IIa. Department of Civil Engineering
A. Master of Science and Postgraduate Diploma in Hydraulics, Hydrology and Coastal Dynamics
B. Dr. J. M. Townson

IIb. Department of Ship and Marine Technology
A. Degrees Offered
1. Bachelor of Science in Naval Architecture
2. Master of Science in Ship Production Technology
3. Doctor of Philosophy
B. Professor C. Kuo

IIc. Department of Ship and Marine Technology
A. Degrees Offered
1. Master of Science in Marine Technology
2. Doctor of Philosophy
B. Professor C. Kuo

IIIa. Coastal Dynamics (and Hydraulics and Hydrology)
A. First or second class honors degree or equivalent
B. Degree Requirements
1. Postgraduate Diploma in Hydraulics, Hydrology and Coastal Dynamics: 12 credits selected from 16 attended; thesis
2. Master of Science in Hydraulics, Hydrology and Coastal Dynamics: minimum of 16 credits; research; thesis
C. Options or Information
1. Credits are available in three groups: Basic, Supporting, and either Water Resources or Coastal Options
2. The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IIIb. Ship Production Technology
A. First or second class university honours degree or equivalent
B. Degree Requirements
1. Master of Science: instructional lectures; research workshops; project; thesis
2. Doctor of Philosophy: the above, plus additional lectures
C. Options or Information
1. Practical industrial experience before coming to the program is useful

2. The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IIIc. Marine Technology
- A. First or second class university honours degree or equivalent
- B. Degree Requirements
  1. Master of Science: instructional lectures; research workshops; project; thesis
  2. Doctor of Philosophy: the above, plus additional lectures
- C. Options or Information
  1. Practical industrial experience before coming to the program is useful
  2. The University is a participant in the West European Graduate Education in Marine Technology (WEGEMT).

IV. Postgraduate Courses of Subjects (credits)
- A. Coastal Dynamics
  Similarity and Model Techniques (1)
  Hydrodynamics (1)
  Engineering Hydrology (1)
  Water Resources Development (2)
  Simulation Techniques in Hydrology (2)
  Unsteady Flow (2)
  Sediment Transport and Diffusion Processes (2)
  Coastal Dynamics (2)
  Estuary Phenomena (1)
  Mathematical Models (2)
  Statistical Hydroscience (2)
  Geology for Engineers (2)
  Geomorphology (1)
  Groundwater (2)
  Physical Oceanography (1)
  Coastal and Offshore Structures (1)
  Constructional Materials in the Sea (1)
  Main in the Sea (1)
- B. Ship Production Technology
  1. Principal Topics
     Shipbuilding
     Computer Aided Ship Design and Production
     Welding of Marine Structures
     Marketing and Finance
     Industrial Relations and Behaviour
     Operational Research
  2. Additional Topics
     FORTRAN Programming
     NC Control
     Marine Corrosion
     AC Power Systems for Ships
     Application of Statistics
- C. Marine Technology
  1. Principal Topics
     Marine Resources and their Environment

Ocean Engineering Systems
Behaviour of Ocean Structures
Welding of Marine Structures
Marketing and Finance

2. Additional Topics
Man in the Sea
Marine Corrosion
Instrumentation
Computer Appreciation and Programming

I. California State Polytechnic University, Pomona
3801 West Temple Avenue
Pomona, California 91768
United States of America

II. Division of Engineering Graduate Studies, School of Engineering
A. Master of Engineering
B. Professor Seung P. Li

III. Ocean Engineering
A. Accredited baccalaureate degree in engineering or equivalent
B. Degree Requirements: unknown
C. Options or Information: none

IV. Postgraduate Courses or Subjects (credits)
ECE 430 Ocean Engineering (4)
ECE 434 Underwater Electronics (4)
ECE 499 Control and Monitoring Systems for Undersea Work Vehicles (4)
ARO 410 Hydronautics (4)
ARO 411 Hydrospace Laboratory (2)
ARO 415 Offshore Structures (4)
ARO 416 Hydrospace Structures (4)
CE 455 Coastal Engineering (4)
CHE 432 Pollution Abatement (3)
EGR 526 Hydrodynamics (4)
EGR 599 Ocean Engineering (4)
EGR 631 Atmospheric Pollution Dynamics (4)

I. California State University
Long Beach, California 90840
United States of America

II. Department of Electrical Engineering
A. Degrees Offered
1. Bachelor of Science in Ocean Engineering
2. Master of Science in Engineering
B. Captain L. Boyd Kendall

III. Ocean Engineering
A. Unknown
B. Unknown
C. Options or Information
Multidisciplinary program, presumably with a selection of courses offered in the Departments of Civil, Electrical and Mechanical Engineering

IV. Postgraduate Courses or Subjects
Unknown

I. Florida Atlantic University
Boca Raton, Florida 33431
United States of America

II. Department of Ocean Engineering
A. Degrees Offered
1. Bachelor of Science in Ocean Engineering
2. Master of Science in Engineering
3. Master of Engineering
B. Professor J. S. Tennant

III. Ocean Engineering
A. Baccalaureate Degree in engineering or physical sciences; B average or better during last two years as an undergraduate
B. Degree Requirements
1. Master of Science in Engineering: minimum of 45 quarter credits of course work including a thesis
2. Master of Engineering: minimum of 54 quarter credits of course work
C. Options or Information
In-depth studies in the following areas:
1. Marine materials and corrosion
2. Underwater communications and acoustics
3. Ocean structures
4. Hydrodynamics

IV. Postgraduate Courses or Subjects (quarter credits)

EOC 5220	Soil Mechanics for Ocean Engineers (3)
EOC 6135L	Ocean Engineering Laboratory (3)
EOC 6152	Advanced Mechanics of Materials in Ocean Application (3)
EOC 6153	Theory of Plates (3)
EOC 6154	Theory of Elasticity (3)
EOC 6155	Finite Element Method for Ocean Structures (3)
EOC 6180	Modern Hydrodynamics (3)
EOC 6181	Ocean Hydrodynamics (3)
EOC 6185	Hydrodynamics of Ideal Flow (3)
EOC 6186	Hydrodynamics of Viscous Flow (3)
EOC 6187	Advanced Marine Hydrodynamics (3)
EOC 6194	Advanced Heat Transfer (3)
EOC 6195	Mass Transfer (3)
EOC 6216	Corrosion I (3)
EOC 6218	Corrosion II (3)
EOC 6225	Sediment Properties and Near Shore Processes (3)
EOC 6310	Underwater Acoustics (3)
EOC 6311	Advanced Acoustics I (3)
EOC 6312	Advanced Acoustics II (3)
EOC 6405L	Experimental Stress Analysis (3)
EOC 6415	Ocean Structures Analysis (3)
EOC 6425	Ocean Structural Dynamics (3)
EOC 6615	Linear Systems Analysis (3)
EOC 6630	Signal Processing (3)
EOC 6908	Directed Independent Study (1-5)
EOC 6934	Special Topics (1-6)
OCE 6066	Physical Aspects of Oceanography (3)

I. Florida Institute of Technology
P.O. Box 1150
Melbourne, Florida 32901
United States of America

II. Department of Oceanography and Ocean Engineering
A. Master of Science in Ocean Engineering
B. Dr. A. W. Revay, Jr. (Acting)

III. Ocean Engineering
A. Undergraduate major in one of the physical sciences or engineering; mathematics through differential equations; introductory physics and chemistry
B. Minimum of 48 quarter hours of required and elective work; thesis
C. Options or Information: none

IV. Postgraduate Courses or Subjects (quarter credit hours)
A. Required
OE 5511 Ocean Engineering Seminar (0)
OE 5518 Marine Corrosion (3)
OE 5542 Ocean Engineering Systems Design (3)
OE 5543 Computer Methods in Ocean Engineering (3)
OE 5563 Port and Harbor Engineering (3)
OE 5599 Thesis Research (6)
O 5106 Principles of Oceanology (3)
O 5403 Ocean Wave Theory (3)
O 5711 Geodynamic Methods (3)
O 5801 Coastal Systems Planning (3)
M 5075 Numerical Analysis I (3)
B. Recommended Electives
OE 5544 Principles of Hydroacoustics (3)
OE 5551 Advanced Mechanics of Materials (3)
O 5201 Principles of Chemical Oceanography (3)
O 5401 Principles of Physical Oceanography (3)
O 5413 Coastal and Estuarine Processes (3)
O 5601 Principles of Geological Oceanography (3)
O 5621 Marine Geophysics (3)
O 5641 Marine Sedimentation (3)

I. Massachusetts Institute of Technology
Cambridge, Massachusetts 02139
United States of America

II. Department of Ocean Engineering
A. Degrees Offered
1. Undergraduate: Bachelor of Science in Ocean Engineering, in Naval Architecture and Marine Engineering
2. Postgraduate: Master of Science; Ocean Engineer; Doctor of Philosophy; Doctor of Science
B. Professor T. Francis Ogilvie

III. Ocean Engineering; Naval Architecture and Marine Engineering; Ocean Systems Management
A. Equal in quality, quantity, and breadth of coverage to the department's undergraduate curricula
B. Degree Requirements
1. Master of Science: minimum of 72 subject units; thesis (48 to 72 units must be "A" or advanced subjects)
2. Engineer's Degree: includes 2 subjects in areas of Economics, Industrial Management, Public Policy, or Law, and at least 12 units of Comprehensive Design
3. Doctoral Degrees: no stated specifics
C. Options or Information
Joint degree program with the Woods Hole Oceanographic Institution

IV. Postgraduate Courses or Subjects (credit in units)

13.012 Applied Hydrostatics (1)
13.021 Marine Hydrodynamics I (A) (4)
13.022 Marine Hydrodynamics II (A) (4)
13.04 Hydrofoils and Propellers (A) (4)
13.05 Boundary Layers (A) (3)
13.07 Free Surface Hydrodynamics (A) (3)
13.08 Stability and Motion Control of Ocean Vehicles (A) (4)
13.09 Potential Flows (A) (3)
13.111 Structural Mechanics (A) (3)
13.112J Analysis and Design of Offshore Structures (A) (3)
13.121 Ship Structures (A) (3)
13.122 Ship Structural Design (A) (1)
13.123 Advanced Analysis and Design of Ocean Engineering Structures (A) (3)
13.131 Plastic Analysis of Structures (A) (3)
13.132 Advanced Structural Topics (A) (3)
13.14J Structural Mechanics in Nuclear Power Technology (A) (3)
13.16J Fracture of Structural Materials (A) (3)
13.17J Welding Engineering (A) (3)
13.21 Ship Power and Propulsion (A) (3)
13.26J Thermal Power Systems (A) (3)
13.39 Analysis of Techniques for Fabricating Structures (A) (2)
13.401 Control Theory Applications in Ocean Engineering (A) (3)
13.411 Principles of Naval Ship Design (A) (2)
13.412 Principles of Ship Design (A) (2)

13.431 Methods of Naval Ship-System Design (A) (3)
13.451 Projects in Naval Ships Conversion Design (A) (?)
13.461 Projects in New Construction Naval Ship Design (A) (?)
13.462 Projects in Ocean Engineering System Design (A) (?)
13.463 Engineering System Design (A) (2)
13.47 Wave Loads and Motions of Marine Structures (A) (2)
13.48 Offshore Engineering Design (A) (2)
13.50 Computer Applications to Marine Problems (3)
13.61 Network Scheduling, Routing and Planning (A) (3)
13.62J Engineering Systems Analysis (A) (3)
13.621 Engineering Risk-Benefit Analysis (A) (3)
13.63 Reliability, Availability and Maintainability of Systems (A) (3)
13.631 Port Planning and Development (A) (3)
13.65 Production Analysis (A) (3)
13.661J Economics of Ocean Transportation (A) (3)
13.665J Quantitative Models in Transportation Planning (A) (3)
13.67 Marine Decision Making Under Uncertainty (A) (3)
13.68 Management of Marine Systems (A) (3)
13.681J Issues in Transportation Management (A) (3)
13.69 International Shipping (A) (3)
13.710-13.719 Special Problems in Ocean Engineering (A) (?)
13.730-13.739 Seminar in Ocean Engineering (?)
13.74J Marine Data Systems (A) (3)
13.76 Introduction to Random Processes in Ocean Engineering (A) (3)
13.77J Invention (3)
13.774 Advanced Engineering Internship (0)
13.78 Entrepreneurship (4)
13.80J Mechanical Vibration (3)
13.81J Principles of Acoustics (A) (3)
13.82J Sound and Structural Vibration (A) (3)
13.84J Flow Noise (A) (3)
13.85 Fundamentals of Underwater Sound Applications (A) (3)
13.86 Ocean and Seabed Acoustics (A) (3)
13.903 Advanced Ocean Engineering Laboratory (A) (0)
13.92 Public Policy and Use of the Sea (A) (3)
13.93 Fisheries Management (A) (3)
13.94J Ocean Engineering and Law Seminar (A) (3)
13.961J Resources Management (A) (3)
13.962 Legal Aspects of Ocean Resources and Systems Management (A) (3)
13.98J Coastal Zone Management (A) (3)
13.990J Oceanographic Systems I (2)
13.991J Oceanographic Systems II (2)
13.992 Marine Navigation, Positioning and Data Telemetry (A) (3)
13.994 Buoy Engineering (A) (3)
13.997 Principles of Oceanographic Instrument Systems I - Measurement Platforms (A) (3)
13.998 Principles of Oceanographic Instrument Systems II - Sensors and Measurements (A) (3)
13.999J Special Projects in Oceanographic Engineering (A) (?)

I. North Carolina State University at Raleigh
P.O. Box 5923
Raleigh, North Carolina 27650
United States of America

II. Department of Marine Science and Engineering
A. Degrees Offered
1. Master of Science
2. Doctor of Philosophy
B. Professor Jay Langfelder

III. Coastal and Ocean Engineering
A. Bachelor of Science degree in an engineering discipline
B. Degree Requirements
1. Master of Science: 30 hours; thesis not required
2. Doctor of Philosophy: thesis
C. Options or Information: none

IV. Postgraduate Courses or Subjects (all are 3 semester hours)
MSE 581 Behavior and Analysis of Ocean Structures
MSE 582 Coastal Hydrodynamics
MSE 583 Engineering Aspects of Coastal Processes
MSE 591 592 Marine Science and Engineering Seminar
MSE 685 Design of Coastal Facilities
MSE 687 Numerical Modeling for Nearshore Flow Systems

I. Oregon State University
Corvallis, Oregon 97331
United States of America

II. Ocean Engineering Committee
A. Degrees Offered
1. Master of Ocean Engineering
2. Doctor of Philosophy
B. Chairman, Ocean Engineering Committee, Department of Civil Engineering

III. Ocean Engineering
A. Baccalaureate in civil, mechanical and electrical engineering or physics
B. Degree Requirements
1. Core courses (see below)
2. Thesis
C. Options or Information
1. Ocean Structures-Structural Design
2. Ocean Structures-Fluid Mechanics
3. Estuary and Marine Hydrodynamics
4. Others not specified

IV. Postgraduate Courses or Subjects (credits)
A. Core Courses
CE 503 Thesis (6)
CE 507E Seminar (2)
CE 570 Coastal Hydraulics (4)
CE 579 Special Topics: Random Waves (3)
ME 470, 471, 472 Mechanical Engineering Analysis (9)
ME 573 Numerical Methods for Engineering Analysis (3)
ME 581 Selected Topics: Corrosion (3)
OC 531 Descriptive Physical Oceanography (4)
B. Elective Courses
CE 441 Ocean Engineering (3)
CE 441x Introduction to Ocean Engineering (3)
CE 503 Thesis
CE 507 Seminar
CE 522 Fluid Mechanics (3)
CE 524 Sediment Transport (3)
CE 526 Hydraulics of Open Channels (3)
CE 532 Finite Element Analysis (3)
CE 539 Plate and Shell Structures (3)
CE 544 Environmental Engineering Chemistry (3)
CE 548 Water Quality Dynamics (3)
CE 566 Ocean Position Surveying (3)
CE 570 Coastal Hydraulics (4)
CE 571 Forces on Marine Structures (3)
CE 572 Marine Water Quality Dynamics (3)
CE 574 Ocean Engineering Facilities Planning (3)
CE 578 Marine Geotechnique (3)
CE 579 Special Topics in Ocean Engineering

ME 470, 471, 472 Mechanics Engineering Analysis (3)
ME 557 Incompressible Fluid Mechanics (3)
ME 566, 567, 568 Advanced Dynamics (3)
ME 573 Numerical Methods for Engineering Analysis (3)
ME 581 Selected Topics in Materials Science (3)
Oc 511 Littoral Processes and Sedimentation (3)
Oc 531 Descriptive Physical Oceanography I (3)

I. Stevens Institute of Technology
Castle Point Station
Hoboken, New Jersey 07030
United States of America

II. Department of Ocean Engineering
A. Degrees Offered
1. Master of Engineering
2. Doctor of Philosophy
B. Professor John P. Breslin

III. Ocean Engineering
A. Prerequisites to Enter Program
1. Master of Engineering: Bachelor's Degree in Engineering, Physical Sciences, or Mathematics; mathematics through ordinary and partial differential equations and vector analysis
2. Doctor of Philosophy: Master's Degree or equivalent; required courses at Stevens for the Master of Engineering (Ocean) degree
B. Degree Requirements
1. Master of Engineering: minimum of eight courses in Ocean Engineering, including the four basic courses listed below; thesis
2. Doctor of Philosophy: participation in OE 280 course; dissertation
C. Options or Information
A Mini-Graduate Program in Marine Vehicle Dynamics leads to a Certificate of Special Study: courses are 205, 220, 221 and 222

IV. Postgraduate Courses or Subjects (all 2.5 credits except as noted)
OE 101 Oceanography
OE 103 Seminar in Ocean Engineering
OE 125 Principles of Naval Architecture
OE 127 Laboratory in Naval Architecture
OE 130 Yacht Design
OE 141 Acoustics
OE 143 Acoustics Laboratory
OE 200 Fluid Dynamics for Ocean Engineering I
OE 201 Fluid Dynamics for Ocean Engineering II
OE 203 Dynamic Oceanography
OE 205 Stochastic Analysis of Ocean Waves
OE 215 Estuarine Oceanography
OE 220 Dynamics of Ocean Waves
OE 221 Motion of Vessels in Waves
OE 222 Stability and Control of Marine Craft
OE 223 Design of Ship Propellers
OE 224 Hydrodynamics of High-Speed Marine Craft
OE 226 Behavior of Ocean Platforms
OE 231 Vibrational Response of Ocean Structures
OE 242 Air-Sea Interactions: Theory and Measurement
OE 250 Optimal Control of Marine Systems

OE 251 Optimal Estimation for Ocean Engineers
OE 253 Topics of Marine Structures I
OE 254 Topics of Marine Structures II
OE 280 Special Topics in Ocean Engineering
OE 400 Special Problems in Ocean Engineering (1-3)
OE 401 Special Problems in Ocean Engineering (1-3)

I. Texas A & M University
College Station, Texas 77843
United States of America

II. Ocean Engineering Program
A. Degrees Offered
1. Bachelor of Science in Ocean Engineering
2. Master of Science and Master of Engineering in Ocean Engineering
3. Doctor of Philosophy in Ocean Engineering
4. Doctor of Engineering
B. Professor John B. Herbich

III. Ocean Engineering Program
A. Well versed in appropriate supporting disciplines, particularly mathematics and hydromechanics
B. Degree Requirements
1. Master of Science: 32 credit hours and a thesis, including required 'A1' courses, below; non-thesis option requires 36 credits
2. Master of Engineering: 36 credits, 1/3 of which are in fields outside of ocean engineering
3. Doctor of Philosophy: 64 credits beyond Master's Degree and a dissertation; required courses "B", plus 6 credits in mathematics, statistics, and numerical methods, and 3 credits in fluid mechanics, in addition to the "A2" courses, below
4. Doctor of Engineering: a number of required non-ocean engineering courses totaling 40 credits and 56 additional credit hours of work
C. Options or Information
A wide variety of areas in ocean engineering

IV. Postgraduate Courses or Subjects (credits)
A. Required Courses
1. Master of Science and Master of Engineering in Ocean Engineering
CE 678 Hydromechanics or equivalent (3)
OE 677 Coastal Engineering II (3)
MATH 601 Higher Mathematics for Engineers and Physicists (4)
OCN 608 Seminar (every semester in residence) (1)
2. Doctor of Philosophy in Ocean Engineering
MATH 602 Higher Mathematics for Engineers and Physicists (4)
OE 681 Seminar (every semester in residence) (1)
B. Other Courses
OE 630 Dynamics of Ocean Vehicles (3)
OE 675 Coastal Engineering I (3)
OE 676 Ocean Engineering (3)
OE 677 Coastal Engineering II (3)
OE 678 Hydromechanics (3)

OE 679	Theory of Fluid Mechanics Models (3)
OE 681	Seminar (1)
OE 682	Coastal Sediment Processes (3)
OE 683	Estuary Hydrodynamics (3)
OE 685	Problems (1-6)
OE 686	Offshore and Coastal Structures (3)
OE 687	Marine Foundation Engineering (3)
OE 688	Marine Dredging (3)
CE 688	Computational Fluid Dynamics (3)
OE 689	Special Topics in ... (1-4)

I. University of Alaska, Fairbanks
Institute of Marine Science
Fairbanks, Alaska 99701
United States of America

II. Program in Ocean Engineering
A. Master of Science in Ocean Engineering
B. Professor D. G. Shaw

III. Program in Ocean Engineering
A. Bachelor's Degree (?)
B. Master of Science in Ocean Engineering OCE 670, OCN 620, or equivalents; 6 credits of Oceanography or Marine Biology; 2 credits of OCN 691/692; 15 credits as per Oceanography majors
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (credits)

OCN 620	Physical Oceanography (4)
OCE 670	Ocean Engineering (3)
OCN 691/692	Marine Science Seminar (1)

I. University of California, Berkeley
Berkeley, California 94720
United States of America

IIa. College of Engineering Interdisciplinary Studies
- A. Degrees Offered
  1. Master of Science in Engineering
  2. Master of Engineering
  3. Doctor of Engineering
  4. Doctor of Philosophy
- B. Interdisciplinary: Contact the Dean of the College or specific department heads

IIb. Department of Naval Architecture and Offshore Engineering
- A. Degrees Offered
  1. Bachelor of Science
  2. Master of Science
  3. Master of Engineering
  4. Doctor of Philosophy
  5. Doctor of Engineering
- B. Professor W. C. Webster (1981-82)

IIIa. Engineering in the Ocean Environment
- A. Bachelor of Science degree minimum
- B. Degree Requirements
  1. Master of Science in Engineering: basic courses taken in a single subject area
  2. Master of Engineering: two years of study; plus minor in non-engineering field; independent study project; oral examination
  3. Doctor of Engineering: courses plus dissertation emphasizing complex design or construction orientated problem or project
  4. Doctor of Philosophy in Engineering: dissertation based on original research
- C. Options or Information: unknown

IIIb. Naval Architecture and Offshore Engineering
- A. Unknown
- B. Core courses in ship hydrodynamics and ship structures; specialized courses; electives; thesis
- C. Options or Information
  Major research facilities
  1. Ship-model Towing Tank
  2. Hull-girder Bending Machine
  3. Water-impact Machine
  4. Hewlett-Packard 1000 Computer System

IV. Postgraduate Courses or Subjects (credit in units)
- A. Engineering in the Ocean Environment - sample programs:
  1. Master of Engineering - Emphasis on Geotechnical Engineering
     E 201 Ocean Engineering Seminar (2)

NA 290 E Vehicles for Ocean Engineering (3)
CE 201 A Physical Oceanography (3)
CE 201 C Seafloor Sediments: Origin, Properties and Offshore Engineering Applications (3)
CE 205 A-B Coastal Engineering (3) (3)
CE 267 C Construction of Harbor, Coastal and Ocean Structures (4)
CE 270 A-B-C Advanced Soil Mechanics and Foundation Engineering (3) (3) (3)
CE 270 L Advanced Soil Mechanics and Foundation Engineering Laboratory (3)
CE 271 Seepage Through Soils (2)
CE 273 Soil Behavior (4)
CE 275 Soil Dynamics-Earthquake Engineering (3)
Non-Engineering Breadth (12)
Individual Study (6)

2. Master of Engineering - Emphasis on Structural Engineering
E 201 Ocean Engineering Seminar (2)
CE 201 A Physical Oceanography (3)
CE 201 C Seafloor Sediments: Origin, Properties and Offshore Engineering Applications (3)
CE 205 A-B Coastal Engineering (3) (3)
CE 225 A-B Dynamics of Structures (3) (3)
CE 226 Random Vibrations of Structural Systmes (4)
CE 244 Advanced Prestressed Concrete (4)
CE 246 Design of Steel Structures (4)
CE 267 B Advanced Concrete Construction (4)
CE 267 C Construction of Harbor, Coastal and Ocean Structures (4)
CE 270 A-B-C Advanced Soil Mechanics and Foundation Engineering (3) (3) (3)
Non-Engineering Breadth (12)
Individual Study (6)

3. Master of Engineering - Emphasis on Construction Engineering and Management
E 201 Ocean Engineering Seminar (2)
CE 201 A Physical Oceanology (3)
CE 201 C Seafloor Sediments: Origin, Properties and Offshore Engineering Applications
CE 205 A-B Coastal Engineering (3) (3)
CE 246 Design of Steel Structures (4)
CE 266 A Construction Scheduling and Resource Allocation (3)
CE 266 D Management of International Construction (3)
CE 267 A Advanced Concrete Construction (3)
CE 267 C Construction of Harbor, Coastal and Ocean Structures (4)
CE 267 D Advanced Construction Estimating (3)
CE 270 A-B-C Advanced Soil Mechanics and Foundation Engineering (3) (3) (3)
NA 151 Statics of Naval Architecture (3)
NA 290 E Vehicles for Ocean Engineering (3)
Non-Engineering Breadth (12)
Individual Study (6)

4. Master of Engineering - Emphasis on Floating Marine Structures and Systems

E	201	Ocean Engineering Seminar (2)
CE	133	Theory of Reinforced Concrete Design (4)
CE	201 A	Physical Oceanology (3)
CE	201 C	Seafloor Sediments: Origin, Properties and Offshore Engineering Applications
CE	205 A-B	Coastal Engineering (3) (3)
CE	267 C	Construction of Harbor, Coastal and Ocean Structures (4)
NA	140 A-B-C	Theory of Ship Structures (3) (3) (3)
NA	241 A-B-C	Hydrodynamics of Ships (3) (3) (3)
NA	290 D	Analysis of Ship Systems (3)
NA	290 E	Vehicles for Ocean Engineering (3)

Non-Engineering Breadth (12)
Individual Study (6)

5. Master of Engineering - Emphasis on Coastal Engineering

E	201	Ocean Engineering Seminar (2)
CE	200 A	Fluid Dynamics for Civil Engineers (4)
CE	201 A	Physical Oceanology (3)
CE	201 C	Seafloor Sediments: Origin, Properties and Offshore Engineering Applications
CE	205 A-B	Coastal Engineering (3) (3)
CE	209 A-B-C	Hydrologic Mixing Processes (3) (3) (3)
CE	267 C	Construction of Harbor, Coastal and Ocean Structures (4)
CE	298	Ocean Waves (4)
CE	299	Individual Study (6)
ME	290 N	Corrosion (4)
NA	290 E	Vehicles for Ocean Engineering (3)

Non-Engineering Breadth (12)

B. Naval Architecture and Offshore Engineering

NA	240 A-B-C	Theory of Ship Structures
NA	241 A-B-C	Hydrodynamics of Ships
NA	242	Advanced Ship Design
NA	290 B	Special Topics in Ship Hydrodynamics
NA	290 D	Analysis of Ship Systems
NA	290 E	Vehicles for Ocean Engineering
NA	298	Seminar

I. University of California, San Diego
La Jolla, California 92093
United States of America

II. Interdepartmental Program, contact one of following:
Graduate Department, Scripps Institution of Oceanography;
Department of Applied Mechanics and Engineering Sciences;
Department of Electrical Engineering and Computer Sciences

A. Degrees Offered
1. Master of Science
2. Candidate of Philosophy
3. Doctor of Philosophy

B. See above

III. Applied Ocean Science

A. Bachelor's or Master's Degree in physical science or engineering; three years of physics or applicable engineering; three years of mathematics

B. Degree Requirements:
Take or demonstrate proficiency in five core courses (see below); dissertation

C. Options or Information
Flexibility is provided by the full range of courses and research interests of the three participating departments

IV. Postgraduate Courses or Subjects

A. Core Courses

S10 210 A	Physical Oceanography
S10 240	Marine Geology
S10 260	Marine Chemistry
S10 280	Marine Communities and Environments
AMES 294 A-B-C	Methods in Applied Mechanics, or
MATH 210 A-B-C	Mathematical Methods in Physics and Engineering

B. Other Courses *

207 A-B-C	Digital Signal Processing
208	Seminar in Applied Ocean Sciences
209	Special Topics
210 B	Physical Oceanography
211 A-B	Ocean Waves
212 A-B	Dynamical Oceanography
214	Introduction to Fluid Mechanics
215 A-B	Experimental Ocean Physics
216 A	Physics of Sediment Transport
216 B	Nearshore Processes
219	Special Topics in Physical Oceanography
220	Topics in Geophysical Continuum Mechanics
221	Topics in Geophysical Fluid Dynamics

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* Courses in marine (oceanographic) biology, chemistry, geochemistry, and geology are not listed.

222	A	Mathematical Tools in Elementary Geomagnetism and Gravity
222	B	Tensors and Continuum Mechanics
223		Geophysical Measurements
224		Internal Constitution of the Earth
226	A	Introduction to Marine Geophysics I
226	B	Introduction to Marine Geophysics II
227	A-B-C	Seismology
228		Structure of Science and Scientific Revolution
229		Geomagnetism
230		Introduction to Inverse Theory
231	A-B	Seismological Methods
232		Interpretation on Seismograms
234		Seminar on Essentials of Geophysics
239		Special Topics in Geophysics

I. University of Delaware
Newark, Delaware 19711
United States of America

II. Interdisciplinary Programs in Ocean Engineering
A. Degrees Offered
1. Master of Applied Sciences
2. Master of Engineering
3. Doctor of Philosophy in Applied Science
B. Professor Robert G. Dean, Department of Civil Engineering

III. Interdisciplinary Program in Ocean Engineering
A. Bachelor's Degree in engineering or engineering science from an accredited university or technical college
b. Depends on department, in part;
1. Master's Programs: 24 semester hours or 8 courses, including a minimum of 2 courses at the 800 level, and 3 from the departmental core - with at least one in, mathematics and one in engineering science; thesis or three additional courses
2. Doctor of Philosophy Program in Applied Science: area of interest one-third (24 semester hours) of program; mathematics, physical, biological and engineering science one-third; plus other requirements, one third
C. Options or Information
Departments participating in program:
1. Civil Engineering
2. Chemical Engineering
3. Electrical Engineering
4. Mechanical and Aerospace Engineering

IV. Postgraduate Courses or Subjects (credits)

CMS 680	Concepts in Applied Ocean Science (1)
CMS 681	Remote Sensing of Environment (3)
CMS 482/682	Remote Sensing in Agriculture (2)
CMS 683	Structural Materials in Seawater (3)
B 671	Ocean Engineering (3)
CE 672	Topics in Ocean Engineering (3)
CE 673	Marine Soils Engineering (4)
CE 674	Coastal and Estuarine Geotechnique (3)
CE 675	Engineering in a Coastal Environment (3)
CE 676	Air-Sea Interactions I (3)
CE 677	Air-Sea Interactions II (3)
CE 678	Transport and Mixing Processes (3)
CE 680	Littoral Processes (3)
CE 681	Water Wave Spectra (3)
CE 682	Nearshore Hydrodynamics (3)
CE 815	Probabilistic Structural Engineering (3)
CE 816	Advanced Structural Dynamics (3)
CE 837	Mechanics of Free Surface Flow (3)
CE 839	Applied Hydraulics (3)
CE 870	Marine Hydrodynamics (3)
CE 871	Marine Structures (3)

I. University of Florida
College of Engineering
Gainesville, Florida 32611
United States of America

II. Department of Coastal and Oceanographic Engineering
A. Degrees Offered
1. Master of Engineering
2. Master of Science
3. Engineer
4. Doctor of Philosophy (by other divisions in the Department of Coastal and Oceanographic Engineering)
B. Professor D. Max Sheppard

III. Coastal and Oceanographic Engineering
A. Master of Science and Master of Engineering: Undergraduate degree in engineering, physical science, or mathematics; courses in engineering mechanics and mathematics
B. Degree Requirements
1. Master of Science: with thesis, 45 credits; without thesis, 48 credits
2. Master of Engineering (must have a bachelor's degree in Engineering): with thesis, 45 credits; without thesis, 48 credits
3. Engineer: 45 credits beyond Master's Degree
4. Doctor of Philosophy: 135 credits beyond the Bachelor's Degree
C. Options or Information
Areas of specialization:
1. Coastal structures
2. Ocean structures
3. Coastal processes
4. Ocean processes
5. Coastal and ocean measurements

IV. Postgraduate Courses or Subjects (credit hours)
EOC 5052 Ocean Engineering (3)
EOC 5310 Acoustics in Liquids (3)
EOC 5860 Port and Harbor Engineering (3)
EOC 6196 Littoral Processes (3)
EOC 6430 Coastal and Offshore Structures I (3)
EOC 6431 Coastal and Offshore Structures II (3)
EOC 6850 Simulation Techniques
EOC 6932 Selected Field and Laboratory Problems (1-4)
EOC 6934 Advanced Topics in Coastal and Oceanographic Engineering (1-6)
EOC 6939 Graduate Seminar (1 to a maximum of 6)
OCP 6056 Physical Oceanography (3)
OCP 6156 Ocean Waves I: Linear Theory (3)
OCP 6167 Ocean Waves II: Nonlinear Theory (3)
OCP 6169 Random Sea Analysis (3)
OCP 6295 Estuarial Hydromechanics and Engineering I (3)

OCP 6296 Estuarial Hydromechanics and Engineering II (3)
OCP 6297 Estuarial Hydromechanics and Engineering III (3)
OCP 6555 Air-Sea Interaction (3)
EGM 5816 Intermediate Fluid Dynamics (3)
STA 5855 Stochastic Processes (3)
EOC 6415 Hydromechanics of Coastal and Ocean Structures (3)
OCC 5050 Introduction to Ocean Chemistry for Engineers (3)

I. University of Hawaii at Manoa
Honolulu, Hawaii 96822
United States of America

II. Department of Ocean Engineering (Keller Hall 219, 2565 The Mall)
A. Degrees Offered
1. Master of Science
2. Doctor of Philosophy
B. Professor F. Gerritsen (Acting)

III. Ocean Engineering
A. Solid background in engineering or the physical sciences, combined with senior-level competence in applied mathematics; other requirements
B. Degree Requirements
1. Master of Science
a. Plan A (thesis plan): 30 credits minirum, 8 of thesis and 14 in engineering science
b. Plan B (non-thesis plan): 30 credits minimum, 15 of engineering science and 15 in design-orientated courses
2. Doctor of Philosophy: unknown
C. Options or Information
1. Coastal and Harbor Engineering
2. Marine Structures/Naval Architecture
3. Nearshore Environmental Engineering
4. Ocean Acoustics

IV. Postgraduate Courses or Subjects (credits)
A. Required Courses
OE 603 Oceanography for Ocean Engineers (3)
OE 607 Deterministic Wave Theories (3)
OE 608 Probabilistic Wave Theories (3)
B. Basic Courses in Coastal Engineering
OE 601 Ocean Engineering Laboratory (3)
OE 609 Application of Wave Theories to Ocean Engineering Problems (3)
OE 610 Ocean Engineering Environment (3)
OE 614 Ocean Hydrodynamics Laboratory (2)
OE 651 Instrumentation Seminar (2)
OE 652 Nearshore Marine Survey Techniques (3)
OE 661 Introduction to Coastal and Harbor Engineering (3)
OE 662 Design of Coastal and Harbor Structures (3)
OE 664 Sediment Transport, Littoral Drift and Dredging Technology (3)
OE 766 Estuary Dynamics and Numerical Modeling (3)
C. Basic Courses in Offshore Engineering
OE 411 Buoyancy and Stability (3)
OE 601 Ocean Engineering Laboratory (3)
OE 609 Application of Wave Theories to Ocean Engineering Problems (3)
OE 610 Ocean Engineering Environments (3)

OE 612 Dynamics of Ocean Structures (3)
OE 614 Ocean Hydrodynamics Laboratory (2)
OE 621 Introduction to Ocean Acoustics (3)
OE 623 Electroacoustics (3)
OE 681 Ocean Systems (3)
OE 682 Design of Ocean Systems (3)

D. Technical Electives

OE 412 Resistance and Powering of Ships (3)
OE 699 Directed Reading or Research (v)
OE 631, 632 Structural Design of Ocean Systems I & II (3, 3)
OE 694 Economics of Marine Resources (3)
OE 707 Advanced Wave Dynamics (3)
OE 722 Sonar System Engineering (3)
OE 783 Ocean Engineering Design Project (3)
OE 791 Special Topics in Ocean Engineering (v)

I. University of Miami
Rosenstiel School of Marine and Atmospheric Science
4600 Rickenbacker Causeway
Miami, Florida 33149
United States of America

II. Department of Ocean Engineering
A. Degrees Offered
1. Bachelor of Science in Ocean Engineering as a dual major with Civil Engineering, Electrical Engineering and Mechanical Engineering
2. Master of Science in Ocean Engineering
3. Master of Science and Doctor of Philosophy in Applied Marine Science (under approval)
B. Professor B. Le Mehaute

III. Ocean Engineering
Prerequisites to Enter Program
A. Minimum grade point average of 2.7
B. Degree Requirements
1. Master of Science: 30 credits, 24 in required and elective courses and 7 in thesis research
2. Doctor of Philosophy: 36 course credits, and not less than half of credits open only to postgraduate students (under approval)
C. Options or Information
Interdepartmental Doctor of Philosophy program

IV. Postgraduate Courses or Subjects (credits)
A. Core Program
1. At least two of:
OEN 509 Coastal Engineering (3)
OEN 535 Introduction to Underwater Acoustics (3)
EEN 500 Engineering Analytical Techniques (3)
2. At least one of:
OEN 575 Applied Ocean Hydrodynamics (3)
MEN 512 Intermediate Fluid Mechanics (3)
MPO 511 Geophysical Fluid Dynamics (3)
3. At least one of:
OEN 531 Ocean Measurements (3)
MTH 520 Numerical Analysis I (3)
MTH 521 Numerical Analysis II (3)
B. OEN 689 Ocean Engineering Seminar (1)
C. At least 9 credits of 600-level OEN Courses
OEN 624 Shoreline Processes (3)
OEN 634 Ocean Structures (3)
OEN 640 Numerical Techniques in Ocean Engineering (3)
OEN 644 Terminals and Offshore Engineering (3)
OEN 672 Advanced Underwater Acoustics (3)
OEN 675 Tides and Long Waves (3)
OEN 686 Advanced Ocean Measurements (2)
OEN 689 Ocean Engineering Seminar (1)
OEN 693 Special Problems (1-3)
OEN 698 Advanced Topics (1-3)

I. University of Michigan
N.A. & M.E. Building, North Campus
Ann Arbor, Michigan 48109
United States of America

II. Department of Naval Architecture and Marine Engineering
A. Degrees Offered
1. Master of Science
2. Master of Science in Engineering
3. Naval Architect (professional degree)
4. Marine Engineer (professional degree)
5. Doctor of Philosophy
B. Unknown

III. Naval Architecture and Marine Engineering
A. Prerequisites to Enter Program
1. Master of Science: mathematics through elementary differential equations; introductory courses in solid mechanics, fluid mechanics, and dynamics; computer programing desirable
2. Master of Science in Engineering: equivalent of a University of Michigan Bachelor's Degree in naval architecture and marine engineering
3. Naval Architect or Marine Engineer; Master's Degree usually
4. Doctor of Philosophy: Master's Degree usually
B. Degree Requirements
1. Master's Degrees: 30 credit hours, 15 in the department, dominated by graduate-level courses; 5 hours of mathematics beyond the undergraduate level; individual project
2. Professional Degrees: 30 credit hours beyond the Master's level, including 24 hours in the degree program area and 6 hours of thesis; 3 courses in cognate fields other than mathematics; 9 hours in mathematics beyond the undergraduate level; qualifying examination emphasizing applications of engineering
3. Doctor's Degree: generally one additional year beyond the Master's in organized classroom studies; dissertation
C. Options or Information
1. An opportunity for combined and dual graduate degrees; e.g.; combined or dual in Naval Architecture and Marine Engineering. A minimum of 40 credit hours for combined and 50 hours for dual degrees must be completed.
2. Major areas of study
a. Ship Hydrodynamics
b. Ship Strength and Vibration
c. Marine Engineering
d. Marine Systems, Operation and Design

IV. Postgraduate Courses or Subjects (credit hours)
400 Marine Engineering Management (2)
401 Small Craft Design (3)
402 Small Commercial Vessel Design (3)

403 Sailing Craft Design Principles (3)
410 Ship Strength II (3)
411 Finite Element Applications (3)
420 Ship Resistance and Propulsion II (3)
430 Ship Power Systems II (3)
440 Ship Dynamics II (3)
450 Ocean Engineering II (3)
463 Nuclear Propulsion of Ships (3)
469 Underwater Operations II (3)
470 Ship Design I (3)
475 Design Project (3)
510 Ship Structure Analysis I (3)
511 Special Topics in Ship Structures (variable)
520 Ship Model Testing (variable)
521 Special Topics in Ship Hydrodynamics (variable)
525 Naval Hydrodynamics I (3)
526 Naval Hydrodynamics II (3)
530 Automatic Control in Naval Architecture and Engineering (3)
531 Marine Propulsion Plant Dynamics (3)
535 Propulsion Plant Design Decisions (3)
550 Ocean Engineering (3)
571 Ship Design II (variable)
572 Economics of Ship Design (3)
573 Marine Management (3)
574 Computer-aided Ship Design (3)
590 Reading and Seminar in Marine Engineering (variable)
591 Reading and Seminar in Naval Architecture (variable)
592 Master's Thesis (3)
610 Finite Element Method (3)
615 Ship Structure Analysis II (variable)
620 Advanced Propeller Theory and Cavitation (2)
625 Naval Hydrodynamics III (variable)

I. University of New Hampshire
Durham, New Hampshire 03824
United States of America

II. Untitled Interdisciplinary Program *
A. Bachelor of Science and Master of Science in either Civil Engineering, Mechanical Engineering, or Electrical and Computer Engineering with specialization in Ocean Engineering
B. Associate Dean Donald Melvin, College of Engineering and Physical Sciences

III. See Above
A. Unknown
B. Unknown
C. Options or Information
Both Master's and Doctor of Philosophy degrees programs are interdepartmental and interdisciplinary.
Departments involved are:
1. Chemical Engineering
2. Civil Engineering
3. Electrical and Computer Engineering
4. Mechanical Engineering

IV. Postgraduate Courses or Subjects (credits)

CE 695	Civil Engineering Projects (2-4)
CE 757	Coastal Engineering and Processes (4)
ECE 695	Electrical Engineering Projects (1-4)
ECE 781	Ocean Instrumentation Project (4)
ECE 785	Underwater Acoustics (4)
ECE 796	Special Topics in Electrical Engineering (2 or 4)
Tech 610	Introduction to Ocean Engineering (4)
Tech 697	Ocean Projects Course (4)

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* A new program, Master of Science in Ocean Engineering, is being developed. Contact Associate Dean Melvin for details.

I. University of Rhode Island
College of Engineering
Kingston, Rhode Island 02881
United States of America

II. Department of Ocean Engineering
A. Degrees Offered
1. Master of Science
2. Doctor of Philosophy
B. Professor F. H. Middleton

III. Ocean Engineering
A. Bachelor of Science Degree in any conventional engineering field, mathematics, physical science, or equivalent; courses in thermodynamics and fluid flow. Additional requirements for Doctor of Philosophy: Master of Science degree and thesis in engineering, physical science, or equivalent; additional ocean engineering and oceanography core courses
B. Degree Requirements
1. Master of Science
Thesis and 3 core courses from group A, below; 1 course from group B, below; and 12 elective credits
2. Doctor of Philosophy
See Master of Science requirements; one advanced applied mathematics course; 30 course credits beyond Master's; dissertation
C. Options or Information
1. Acoustics
2. Hydrodynamics
3. Data Collection and Analysis
4. Ocean Systems
5. Materials and Corrosion
6. Others

IV. Postgraduate Courses or Subjects (credits unknown)
A. Core Courses, Group 'A'
OCE 512, 521, 534, 560, 561, 565, 571, 587, 610, 653
B. Core Courses, Group 'B'
OCG 501, 521, 540, 561
C. Courses Offered

OCE 512, 513	Hydrodynamics of Floating and Submerged Bodies
OCE 521	Materials Technology in Ocean Engineering
OCE 524 (CVE 524)	Marine Structural Design
OCE 532	Corrosion Zone Power Plants
OCE 534	Corrosion and Corrosion Control
OCE 535	Advanced Course in Corrosion
OCE 540	Environmental Control in Ocean Engineering
OCE 560	Special Problems - Ocean Instrumentation
OCE 561	Introduction to the Analysis of Oceanographic Data
OCE 565	Ocean Laboratory I
OCE 566	Ocean Laboratory II

OCE 571	Underwater Acoustics I
OCE 581 (GEL 581)	Coastal Engineering Geology
OCE 587	Submarine Soil Mechanics
OCE 605, 606	Ocean Engineering Seminar
OCE 610	Engineering Ocean Mechanics
OCE 611X	Coastal Zone Processes
OCE 612X	Numerical Modeling of Coastal Processes
OCE 653, 654	Ocean Engineering Systems Studies
OCE 661	Analysis of Oceanographic Data Systems
OCE 672	Underwater Acoustics II
OCE 673	Advanced Underwater Acoustic Propagation I
OCE 674	Nonlinear Acoustics
OCE 675	Processing of Underwater Acoustic Data
OCE 676	Acoustic Radiation from Underwater Vibrators

I. University of Southern California
University Park
Los Angeles, California 90007
United States of America

II. Department of Aerospace Engineering
A. Master of Science in Ocean Engineering
B. Professor J. Laufer

III. Program in Ocean Engineering (Interdisciplinary)
A. Bachelor's Degree in any area of engineering or science
B. Minimum of 6 units or 400- or 500-level work in mathematics or engineering analysis; remainder decided on individual basis
C. Options or Information
1. Ocean Dynamics
2. Coastal Engineering
3. Structural Dynamics
4. Other Areas

IV. Postgraduate Courses or Subjects (credits)
471 Introduction to Ocean Engineering (3)
518 Ocean Measurements (3)

I. The University of Texas at Austin
College of Engineering
Austin, Texas 78712
United States of America

II. Interdisciplinary Ocean Engineering Program (Department of Civil Engineering, Ernest Cockrell, Jr., Hall)
- A. Degrees Offered
  1. Master of Science in Engineering
  2. Doctor of Philosophy in Engineering
- B. Professor N. E. Armstrong, Coordinator

III. Ocean Engineering
- A. Science or engineering degree from an accredited institution; others
- B. Degree Requirements
  1. Master of Science in Engineering: 30 semester hours, including 6 hours of thesis
  2. Doctor of Philosophy in Engineering: unknown
- C. Options or Information
  1. Chemical Engineering
  2. Civil Engineering
  3. Electrical Engineering
  4. Mechanical Engineering
  5. Petroleum Engineering
  6. Aerospace Engineering and Engineering Mechanics

IV. Postgraduate Courses or Subjects

ASE 379L.3	Studies in Aerospace Engineering-Hydrodynamics
ASE 382Q.1	Foundations of Fluid Mechanics
ASE 383Q.2	Advanced Topics in Fluid Mechanics
ChE 253M	Chemical Engineering Fundamentals Laboratory
ChE 365	Water Treatment Engineering: Corrosion
ChE 376K	Process Evaluation
CE 358	Introductory Ocean Engineering
MET	Physical Oceanography
CE 380P 1	Ocean Waves and Tides
CE 380P.2	Coastal Engineering
CE 380P.3	Estuarine Engineering
CE 380P.4	Functional Design of Coastal Structures
CE 385K.2	Water Resources - Stream and Estuarine Analysis
CE 394.1	Interaction of Soils and Structures - Selected Problems
CE 394.2	Interaction of Soils and Structures - Methods of Analysis
CE 397.52	Marine Science for Engineers
CE 397.172	Marine and Water Transportation
CE 397.5	Ocean Engineering Problems
EE 374K	Biomedical Electronics
EE 379K	Introduction to Engineering Acoustics
EE 384L.3	Transducers
EE 384L.4	Underwater Acoustics

ME 379M.14	Ocean Engineering Problems
ME 384L.1	Engineering Acoustics I
ME 384L.2	Engineering Acoustics II
ME 397.56	Ocean Engineering Design Project
ME 397.66	Ocean Engineering Structures
PEN 383.2	Advanced Well-logging and Correlation
PEN 383.4	Offshore Drilling and Production Operations
PEN 383.10	Reservoir Engineering for Non-petroleum Engineering Students
PEN 379.1	Oilfield Systems Automation
PEN 383.22	Statistical Decision Theory
PEN 383.27	Operations Research in Petroleum Engineering
PEN 389	Economic Analysis in the Petroleum Industry

I. University of Washington
College of Engineering
Seattle, Washington 98195
United States of America

II. Ocean Engineering Program (326 Mechanical Engineering Building, FU-10)
A. Master of Science in Engineering
B. Professor P. Adee

III. Ocean Engineering Program (Inter-Engineering Group)
A. Bachelor's Degree in engineering, mathematics, or science
B. Minimum of 39 credits, including 30 course credits and 9 thesis credits
C. Options or Information
1. Coastal and Harbor Engineering
2. Marine Structures
3. Social, Legal and Economic Dimensions of Ocean Engineering
4. Instrumentation, Data Gathering and Analysis

IV. Postgraduate Courses or Subjects (credits)

O ENG 401	Introduction to Ocean Engineering (3)
O ENG 425	Underwater Acoustics (3)
O ENG 444/CEWA 444	Coastal Engineering I (3)
O ENG 450	Marine Corrosion and Its Prevention (3)
O ENG 490/ME 490	Naval Architecture (3)
O ENG 491/ME 591	Naval Architecture (3)
O ENG 492/ME 492	Naval Architecture (3)
O ENG 498	Special Topics in Ocean Engineering (1-5)
O ENG 503/CIVE 543	Marine Technology Affairs I (3)
O ENG 504/CIVE 544	Hydrodynamics in Water Quality (3)
O ENG 541/CEWA 541	Hydrodynamics in Water Quality (3)
O ENG 544/CEWA 544	Coastal Hydraulics (3)
O ENG 551/IMS 551	Ocean Engineering Systems Design I (3)
O ENG 552/IMS 552	Ocean Engineering Systems Design II (3)
O ENG 580/CESM 580	Strain Measurements and Instrumentation (3)
O ENG 590/CESM 590	Wind, Wave and Earthquake Response of Structures (3)
O ENG 599	Special Topics in Ocean Engineering (1-5)
O ENG 599	Ocean Instrumentation (3)

I. University of Wisconsin-Madison
1415 Johnson Drive
1261 Engineering Building
Madison, Wisconsin 53706
United States of America

II. Department of Ocean Engineering
A. Master's Degree
B. Professor T. Green III

III. Ocean Engineering Degree Program
A. Bachelor of Science Degree in any field of engineering or physical science
B. Thesis program or independent study program
C. Qualifications or Information: unknown

IV. Postgraduate Courses or Subjects (credit hours)
511 Ocean Dynamics (2)
512 Air-Sea Interaction (2)
514 Coastal Engineering (3)
516 Ocean Environment (biology, chemistry and geology sections) (3)
518 Ocean Engineering Seminar (1)

I. Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061
United States of America

II. Department of Aerospace and Ocean Engineering
A. Degrees Offered
1. Bachelor of Science
2. Master of Science
3. Master of Engineering
4. Doctor of Philosophy
B. Professor J.A. Schetz

III. Ocean Engineering Program
A. Prerequisites to Enter Program
1. Master's Degree: Bachelor's Degree, usually in engineering mathematics, or physics; grade-point average of 2.75/4.0
2. Doctor of Philosophy: above; usually a Master's Degree
B. Degree Requirements
1. Master of Science: thesis or non-thesis; 45 credit hours, including thesis; required courses listed below; other requirements
2. Master of Engineering: non-thesis; above, except thesis
3. Doctor of Philosophy: 135 credit hours beyond Bachelor's Degree; thesis; required courses; other requirements
C. Options or Information: unknown

IV. Postgraduate Courses or Subjects (all courses assumed to be 3 credits)
AOE 5240 Marine Vehicle Dynamics
AOE 6312 Theory of Stratified Flows II
AOE 6320 Hydromechanics of Aquatic Animal Motion
A. Required for Master's Degree
AOE 4400 Applied Numerical Methods
AOE 5101 Advanced Aero-Hydrodynamics
AOE 5131 Vehicle Propulsion I
AOE 5141 Boundary Layer Theory and Heat Transfer I
AOE 5210 Dynamics of Aerospace and Ocean Vehicles
AOE 5221 Vehicle Structures I
AOE 6310 Dynamics of the Ocean
ME 4310 Naval Architecture
Math 4533 Applied Mathematics for Engineers
B. Required for Doctor's Degree
Above, plus
AOE 4280 Marine Vehicle Dynamics
AOE 4500 Ocean Acoustics
AOE 5142 Boundary Layer Theory Heat Transfer II
AOE 5222 Vehicle Structures II
AOE 6311 Theory of Stratified Flows I
C. Other Courses

I. Woods Hole Oceanographic Institution
Woods Hole, Massachusetts 02543
United States of America

II. Department of Ocean Engineering
A. Degrees Offered (joint program with the Massachusetts Institute of Technology)
1. Engineer
2. Doctor of Philosophy
3. Doctor of Science
B. Dr. Robert Spindel

III. Oceanographic Engineering
A. Bachelor's Degree in engineering, mathematics, physics or chemistry
B. Minimum of one year in residence at M.I.T. and at Woods Hole; registration under one of the M.I.T. departments; general knowledge of oceanography; detailed knowledge of oceanographic subjects covered in thesis; thesis on an ocean related engineering problem
C. Options or Information
May obtain Masters Degree at M.I.T. as part of program

IV. Postgraduate Courses or Subjects (credits)
A. Taught at Woods Hole or at M.I.T.
13.74 Marine Data Systems (3)
13.86 Ocean and Seabed Acoustics (3)
13.87 Wave Propagation in Random Media (3)
13.990 Oceanographic Systems I (2)
13.991 Oceanographic Systems II (2)
13.994 Buoy Engineering (3)
13.998 Principles of Oceanographic Instrument Systems II - Sensors and Measurements (3)
B. Approved subjects at M.I.T. taught in the Departments of Chemical Engineering, Civil Engineering, Electrical Engineering and Computer Sciences, Materials Science and Engineering, Mechanical Engineering and Ocean Engineering

Annex II. List of additional universities that have, or may have, postgraduate curricula in some subfield of ocean engineering

Country	University	Ocean Engineering Subfield				
		Harbour and Coastal Engineering	Ocean Engineering (undesignated)	Naval Architecture	Marine Engineering	Other
Australia	University of Western Australia	X				
Brazil	University of Rio de Janerio			X		
	University of Rio Grande		X			
	University of São Paulo			X		
China	National Cheng Kung University			X		
	National Taiwan University			X		
German Democr. Rep.	Wilhelm Pieck University of Rostock					X
Italy	University of Genoa			X		
	University of Naples			X		
	University of Trieste			X		
Saudia Arabia	King Abdulaziz University	X				
Spain	University of Madrid			X		
Thailand	Asian Institute of Technology	X				
U. S. S. R.	Kaliningrad Technological Institute of Fisheries Industries					X
	Leningrad Higher Institute of Marine Engineering				X	
	Leningrad Shipbuilding Institute			X		
	Murmansk Higher Institute of Marine Engineering				X	
	Odessa Institute of Marine Fleet Engineers				X	
United States	Louisiana State University	X				
	U.S. Navy Postgraduate School					X
	Webb Institute of Naval Architecture			X		X